



Investment programme report

Quarter 2 2023/24
(25 June to 16 September 2023)

Contents

3 Introduction

- 4 Purpose and scope
- 5 Investment programme delivery structure

7 Our performance

- 8 Safety performance
- 9 Strategic milestones
- 11 Schedule performance
- 12 Milestones forecast to be late

13 Major projects

- 14 Elizabeth line – Rolling stock
- 15 Four Lines Modernisation
- 17 DLR rolling stock and systems integration
- 19 Piccadilly line upgrade
- 21 Silvertown Tunnel
- 23 Bank station capacity upgrade

25 Rail and station enhancements

- 27 High Speed 2
- 28 Elephant & Castle
- 29 East London line
- 30 Surrey Quays
- 31 Tram replacement rolling stock
- 32 DLR
- 33 London Underground

34 Safe and healthy streets

- 36 Old Street station and roundabout
 - 37 Cycling infrastructure
 - 38 Vision Zero
 - 39 Bus priority
 - 40 Bus safety
-

41 Environment

- 43 London-wide Ultra Low Emission Zone
- 44 Direct Vision Standard phase two
- 45 Electric vehicle infrastructure
- 46 Zero-emission bus fleet
- 47 Waste heat
- 48 Solar private wire
- 49 Building decarbonisation

50 Technology

- 52 Operations technology
- 54 Technology and data

56 Street, bus and rail-sponsored services renewals

- 58 Streets
- 59 Bus
- 60 River services
- 61 London Overground
- 62 DLR
- 63 London Trams

64 London Underground renewals

72 Appendix: Our safety performance data

Introduction

Our investment programme comprises projects to maintain the 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, Elizabeth line, 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 from the Programmes and Investment Committee. It includes programmes of 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

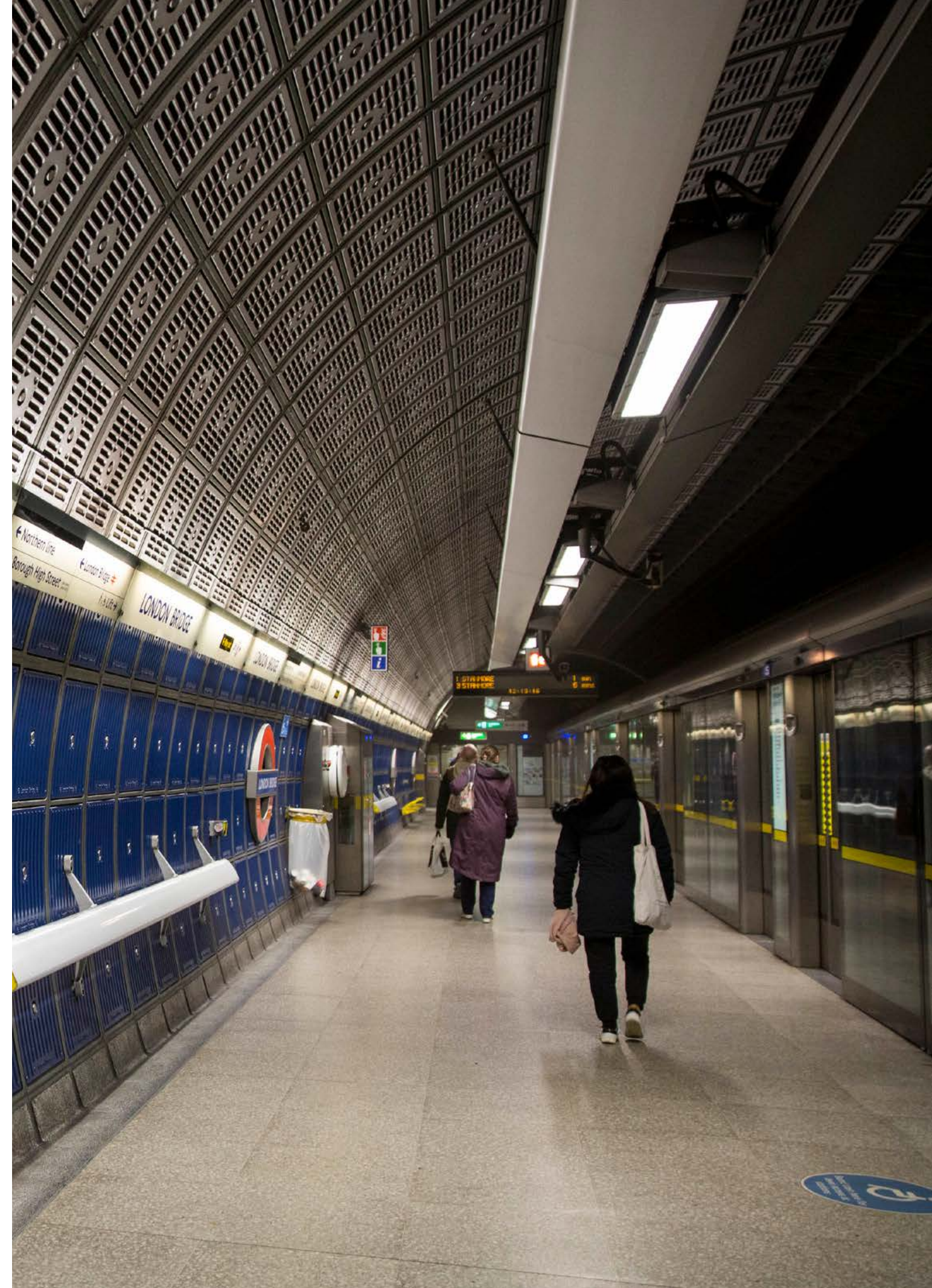
condition. Additional enhancements can unlock new capacity and enable us to use our existing network more intensively.

This report covers Quarter 2, which runs from 25 June to 16 September 2023. For each key project or programme, the financial and milestone data represent the position at the end of Quarter 2, with 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; 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 illustrate financial performance over the last four quarters. The commentary alongside the graph explains any specific trends or changes to trends over a snapshot in time.



Investing in infrastructure unlocks UK-wide growth



Our projects cover everything from green initiatives to line upgrades

Investment programme delivery structure

Our investment programme is delivered by the areas of business set out below. This is reflected in the structure of the report

During Quarter 2 2022/23, on 1 September 2022, we created a new director structure. The changes saw the majority of capital works fall under Capital, the area overseen by the Chief Capital Officer. From Quarter 1 2023/24, the new structure was established. However, there may be further small changes to refine parts of the structure. The structure is set out below.

Major projects

This includes 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 and the Elizabeth line.

Rail and station enhancements

This brings together the London Underground enhancements programme and surface-related enhancements from the Public Transport programme such as the East London line Housing Infrastructure Fund and DLR Royal Docks, in particular where there are links to third-party developments and funding, recognising the similarities in the activities involved and the outcomes that they deliver.

Safe and healthy streets

This is largely unchanged from the previous Healthy Streets programme. The addition of the Bus action plan from the existing Public Transport programme alongside bus priority brings together interconnected activities to deliver the Bus action plan.

It recognises the importance of holistic investment in the bus network, alongside cycling and walking, to increase travel by sustainable modes. Similarly, the addition of bus safety schemes such as intelligent speed assistance alongside the Safer Junctions and Lowering speed limits programmes would align activities to improve safety on London's road network.

Environment

This mainly retains the structure of the Environment programme while also reflecting the new green project pipeline that is being developed.

Technology

This merges the three technology-focused programmes – London Underground technology, Surface technology and Technology and data – with a small number of rail and sponsored-services technology projects currently in the Public Transport programme. These have separate governance despite sharing common resources, stakeholders and delivery of strategic outcomes.

Streets, bus and rail-sponsored services renewals

This groups together renewals that are currently split across the Surface assets and Public Transport programmes. These programmes share a common approach to work-bank management and by combining associated activities such as bus-focused renewals, we can improve investment prioritisation and efficiency.

London Underground renewals

This merges the two existing London Underground renewals programmes – Train systems and Infrastructure. Grouping these projects will enable more holistic oversight and prioritisation in managing renewals across programmes. In addition, this programme will incorporate Railway systems enhancement (formerly World class capacity).



Grouping projects helps provide a more holistic view

Our performance

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



Safety performance

Capital

Capital includes activity under the Chief Capital Officer as well as maintenance activity for which the Chief Operating Officer is responsible. In Quarter 2, our Capital teams worked a combined total of 1.8 million hours; a decrease of 0.1 million hours from the previous quarter.

Quarterly performance

In Quarter 2, there were three incidents which reached the threshold for more than seven days' absence and they were reported under the Reporting of Injuries Diseases and Dangerous Occurrences Regulations 2013 (RIDDOR). As a result, the RIDDOR accident frequency rate for the Capital area has risen from 0.10 to 0.12 at the end of Quarter 2.

There were three lost-time injuries (LTIs) reported, which are injuries that cause an employee to be absent for one or more shift. This is the same number reported during the previous quarter, resulting in the LTI frequency rate remaining stable at 0.22.

There were 11 injuries reported during Quarter 2, with manual handling incidents the most prevalent. Common root causes included lack of communication, poor task design and incorrect use of equipment. Although one more injury was reported compared with the previous quarter, the long-term trend of workforce injuries in Capital continues to decline as we work towards our zero-harm ambitions.

In addition to identifying specific actions in response to each incident, common learnings and key themes from the quarter have been shared across our Capital teams to ensure the systemic root causes are fully addressed.

Significant incidents and near misses

The following section summarises significant incidents that have occurred during the quarter, along with updates and safety initiatives from our Capital team.

Violence, aggression and antisocial behaviour

Unfortunately, this quarter has witnessed a significant number of incidents involving violence or aggression against our employees, or antisocial behaviour, including at our Ultra Low Emission Zone (ULEZ) sites. Our teams are encouraged to report all such incidents so they can be followed up appropriately by our teams and the police. We are working with our suppliers to facilitate the sharing of good practice, and we have also made our Urban Safety training available to our suppliers to ensure all colleagues know how to deal with such incidents.

Safety, health and environment culture assessment

This quarter, the Capital Delivery, Construction and Programme Management teams completed the safety, health and environment culture assessment, which provided colleagues with an opportunity to have their say. More than 500 employees completed the assessment as part of the improvement plan initiative, with the results indicating that the high level of responsibility they feel for managing our safety, health and environment culture.

During the next quarter, workshops will be run within each department to targeted improvement plans to improve our culture. The Engineering and Asset Strategy team will also be completing the assessment in the coming months.

Four Lines Modernisation

The programme has now worked more than two million hours since its last RIDDOR reportable incident. With such a range of activities over a variety of locations this is a notable achievement.

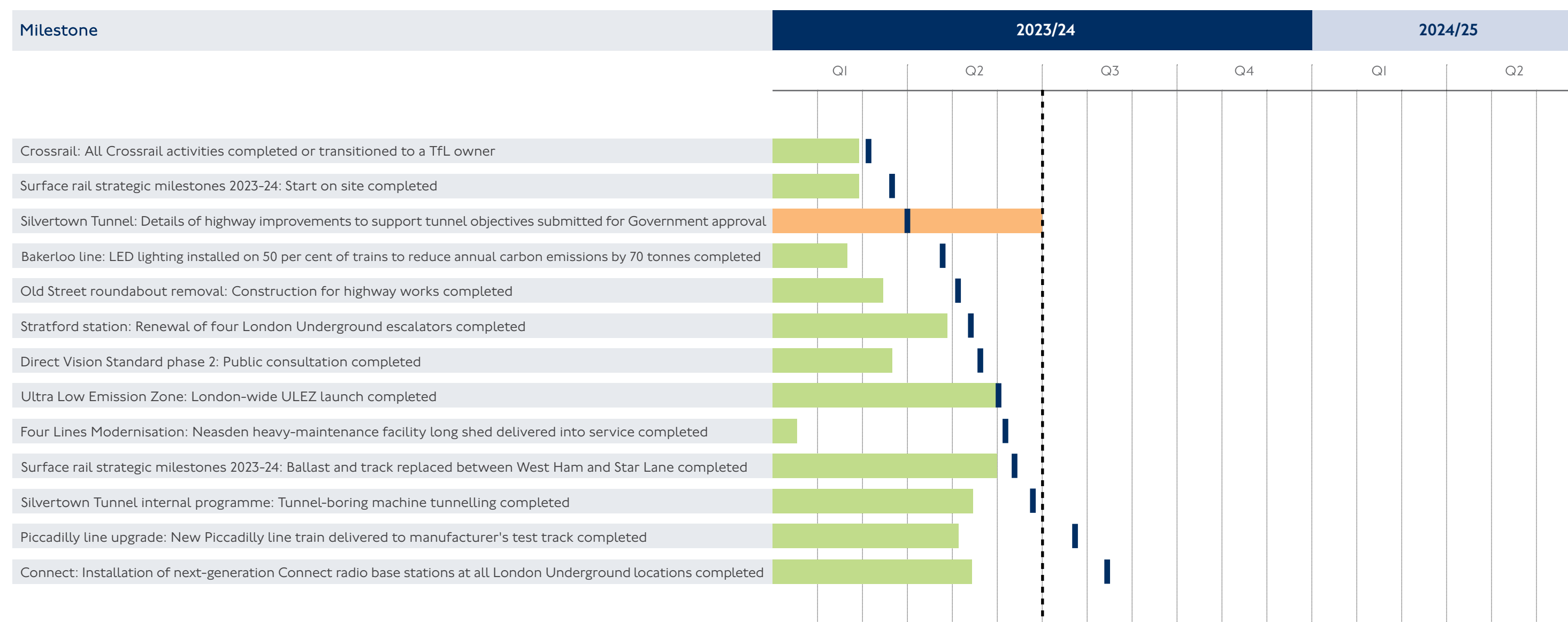
Renewing track and protecting our assets

Following track renewal and bridge component replacement at a bridge over Regent's Canal on the Metropolitan line, inspection of the underside of the bridge was required. Eliminating risks from work on water in a manned boat, our Engineering team took an innovative approach and engaged a contractor with a remote-controlled boat fitted with high-resolution cameras to take videos and images, all operated from the towpath. The operation was completed in under an hour, minimising disruption to canal traffic and risk to colleagues.

Strategic milestones

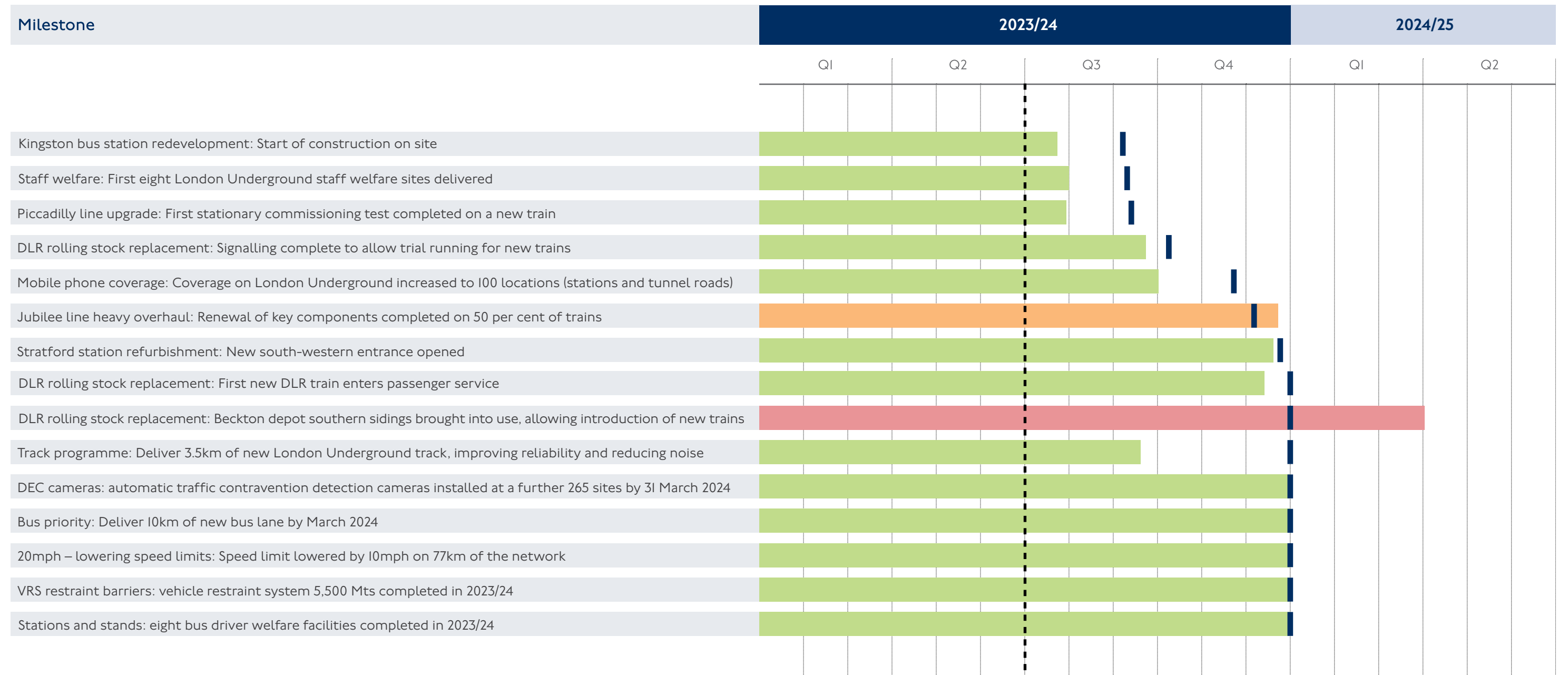
We delivered seven out of 28 strategic milestones either on time or early in Quarter 2, and this year we have delivered 12 out of 28 milestones to date

These are our strategic milestones for 2023/24. The solid blue bar shows when the milestone was due to be met, while the green, amber and red blocks show 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 16 September 2023

Strategic milestones 2023/24 (continued)



■ 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 16 September 2023

Schedule performance

We have achieved a number of scheduled milestones during the quarter

Crossrail

In May 2023, all Crossrail activities were completed or transferred to us.

Surrey Quays station

In May, we began work on the Surrey Quays station upgrade to provide new step-free access and a spacious new ticket hall. These works will help support housing growth and regeneration projects in the local area. To meet the new passenger demand expected as a result of this work, we also started work in June to enhance our signalling and traction power systems to enable us to run 18 trains per hour on this section of the railway by 2025, and then 20 trains per hour beyond that to ensure we continue to meet the growing demand.

Bakerloo line fleet

By May we installed energy-saving LED customer lighting on 50 per cent of Bakerloo line trains to reduce annual carbon emissions by 70 tonnes.

Direct Vision Standard

In June, we completed phase two of the Direct Vision Standard public consultation.

Four Lines Modernisation

In April, the Neasden heavy-maintenance long-shed facility was brought into service.

Old Street roundabout

In June, we completed the construction for highway works at Old Street roundabout.

Connect radio base stations

We completed the installation of next generation replacement Connect radio base stations at all London Underground locations four and a half months ahead of schedule on 25 July 2023, improving reliability and ensuring that operationally-critical infrastructure is now supported into the 2030s.

Piccadilly line upgrade

We delivered the new Piccadilly line train to the manufacturer's test track four months ahead of schedule on 21 July 2023.

Silvertown Tunnel

The Silvertown Tunnel boring machine completed tunnelling 62 days ahead of plan on 23 July 2023.

Replacement of ballast and track

We replaced the ballast and track between West Ham and Star Lane ahead of schedule on 29 August 2023.

London-wide Ultra Low Emission Zone

The London-wide Ultra Low Emission Zone went live as planned on 29 August 2023.

Stratford escalator refurbishment

We completed the renewal of four escalators at Stratford station two months earlier than planned on 26 June 2023.



Our projects help meet growing customer demand



Milestones forecast to be late

Silvertown Tunnel programme

TfL submits to the Secretary of State for approval of wider highway improvements that support the traffic, environmental and socio-economic objects of the Silvertown Tunnel

Details of highway improvements to support tunnel objectives were intended to be submitted for Government approval in a submission to the Secretary of State for Transport. This has been deferred to ensure effective engagement with the boroughs on the planned highway improvements.

DLR – Beckton Depot and network infrastructure

Bring into use Beckton Depot southern sidings to enable the introduction of new DLR trains

This milestone will be impacted by the Principal Contractor for the Northern Sidings project, Buckingham Group, entering into administration as the Southern Sidings can only be commissioned following the Northern Sidings commissioning. We are currently investigating options to bring forward this milestone to facilitate the introduction of new trains and expect to baseline a programme for this next period.

London Underground renewals

Jubilee line (fleet overhaul and component renewal) – Completion of the renewal of key components on 50 per cent of Jubilee line trains

This strategic milestone target date is now expected to be missed by 19 days. The refurbisher of the train wheels has experienced a number of issues since the start of the programme, including inaccurate material estimates, shortage of employees and issues with quality. We are working closely with the supplier to mitigate the delay.

Major projects

This portfolio includes our largest and most complex projects. It comprises line upgrades such as the Piccadilly line upgrade, the Four Lines Modernisation programme and the Elizabeth line



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	1,002	5	1,007	1,149	142
Change since last Investment programme report					
No change	No change	No change	No change	No change	

Financial commentary

The movement of £2m since Q4 2022/23 in the cost to date relates to ongoing rolling stock work that will be completed in 2024/25.

Performance over time commentary

The forecast end date represents the delivery of the rolling stock and depot, including all additional changes. Since authority was awarded in 2013/14, the estimated final cost dropped from £1,090m to £1,007m because the trains have since been part of a sale and leaseback arrangement. They are now being leased and the costs charged as operational costs.

Programme update

Class 345 trains

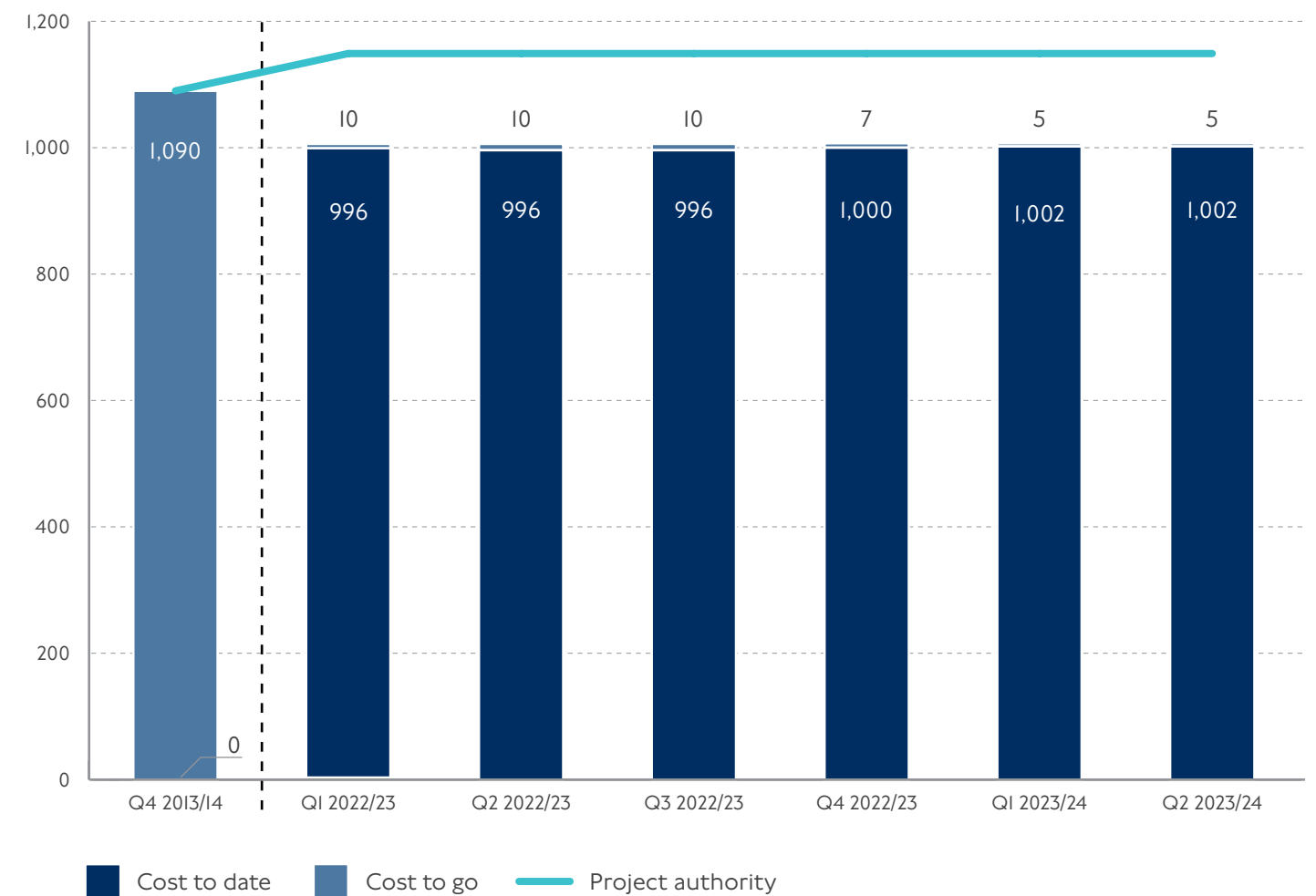
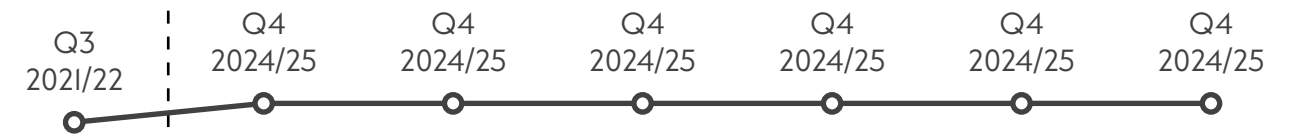
The Class 345 fleet has been operating the peak service of 24 trains per hour since 21 May 2023, consistently meeting the required daily availability level of up to 65 trains.

The manufacturers continue to implement a programme of upgrades to the train hardware and signalling system software to attain further fleet reliability increases.

This has been accounted for in the rolling stock project forecast through to 2025.

Estimated final cost performance over time (£m)

Forecast completion date



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	5,305	181	5,486	5,520	34
Change since last Investment programme report					
No change	21	(21)	No change	No change	

Financial commentary

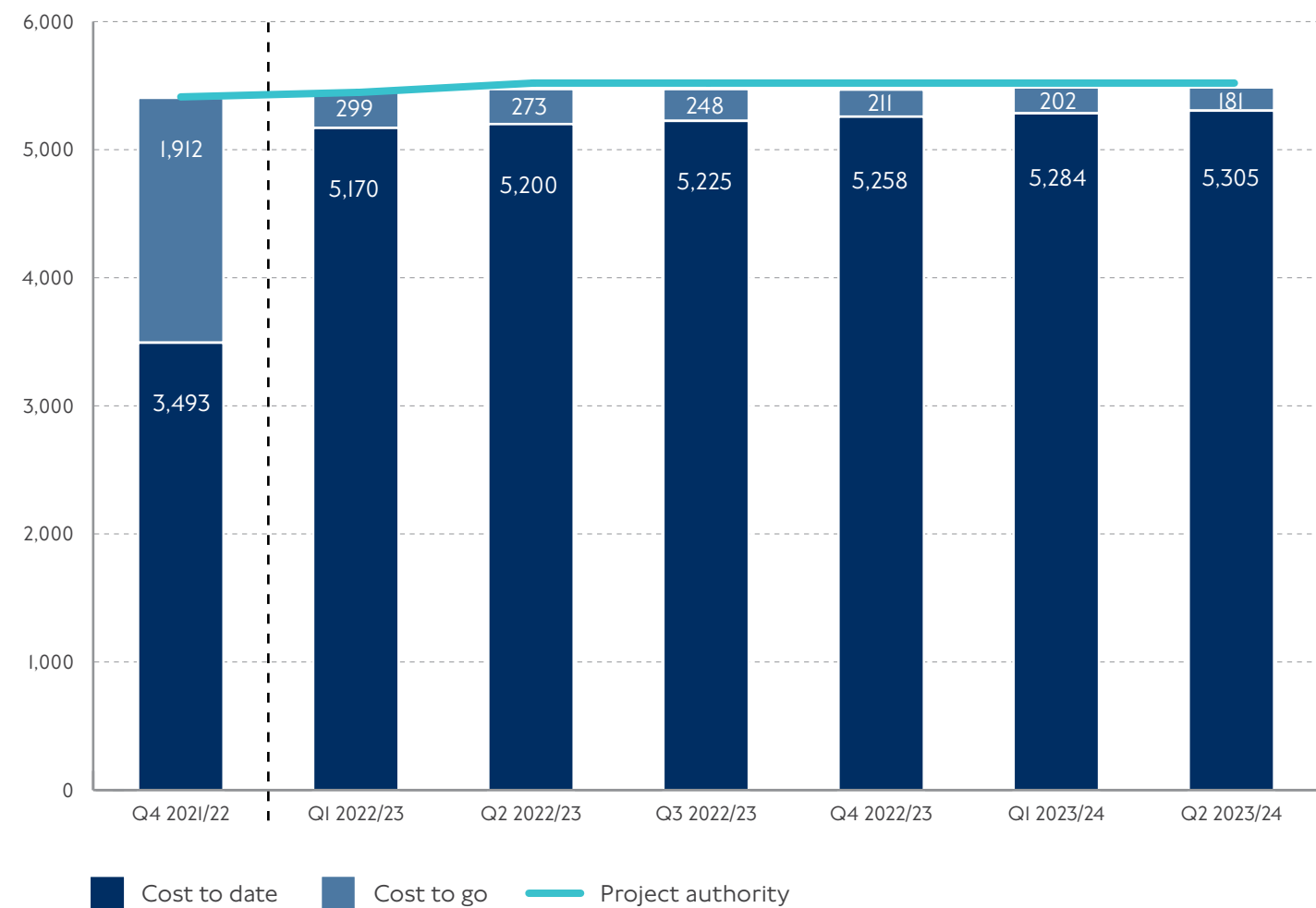
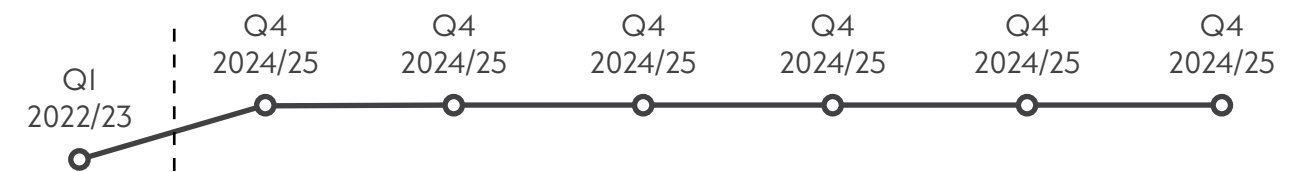
Delivery of the programme continues to be challenging due to its scale and complexity and it continues to face both schedule and cost pressures. A detailed review of the signalling software schedule for the remaining signalling areas that are yet to go live is currently being undertaken in collaboration with our signalling supplier. A further update will be provided in the next report.

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. The date has been delayed from the initial forecast made when the signalling contract was awarded in 2015. This is principally owing to challenges with complex software development, testing and commissioning, and closure availability alongside the impact of the pandemic.

Estimated final cost performance over time (£m)

Forecast completion date





We continue to upgrade our signalling systems

Programme update

We continue to make progress on the programme, which is delivered by progressively installing new signalling on sections of the railway called signal migration areas (SMAs).

The remaining areas still to go live with the new signalling system include the Metropolitan line north of Finchley Road (SMAs 8, 9, 13 and 14) and sections of the District line from Barons Court to Stamford Brook (SMA10) and Fulham Broadway to East Putney (SMA12).

Software development continues for the next SMA to be commissioned, covering the Metropolitan line between Finchley Road and Preston Road (SMA8) which is due to go live in 2024. SMA8 is the most complex area for integrating the new signalling system on the Metropolitan line with the Jubilee line and Neasden depot train control software, with significant testing challenges expected.

This has created challenges in determining with confidence the precise go live date for SMA8 in 2024, and this is currently being reviewed by the project team.

The team is committed to working collaboratively with our signalling supplier to meet the programme challenges and implement measures to minimise or mitigate the risks associated with the remaining migration areas.

In a significant step forward for the programme, we recently completed the second system test for SMA9 in Harrow, successfully testing the integration of Chiltern trains with the new signalling system for the first time. On 10 and 11 November, works were also successfully undertaken during a closure to test the connection between the control systems of the Jubilee and Metropolitan lines to ensure communication between them.

Unrelated to the commissioning of SMA7, we identified two significant software issues in the commissioned system which, following the implementation of corrective software on the 5 August 2023, have now been resolved. This has enabled the removal of the associated temporary mitigation measures.

Design and installation of trackside signalling assets continues in the areas which are yet to go live. Installation is on target to be substantially complete by the end of March 2024.

Works are progressing on the planned upgrades to the heavy-lifting shed at Neasden depot and the new employee accommodation block. When complete, this facility will enable the planned overhaul of Metropolitan line trains.

Line upgrades

DLR rolling stock and systems integration

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	408	496	904	881	(23)
Change since last Investment programme report					
No change	41	11	52	No change	

Financial commentary

Since the last report, the EFC has seen significant increases following the insolvency of the Principal Contractor delivering infrastructure works at Beckton depot and the reassessment of the likely outturn cost of all remaining works across the entire programme, including estimates for unprocured scope and future inflationary allowances as well as opportunities to reduce costs.

We continue to review options to mitigate these cost pressures where possible. A full paper detailing these cost pressures will be presented at the upcoming Programmes and Investment Committee meeting.

Performance over time commentary

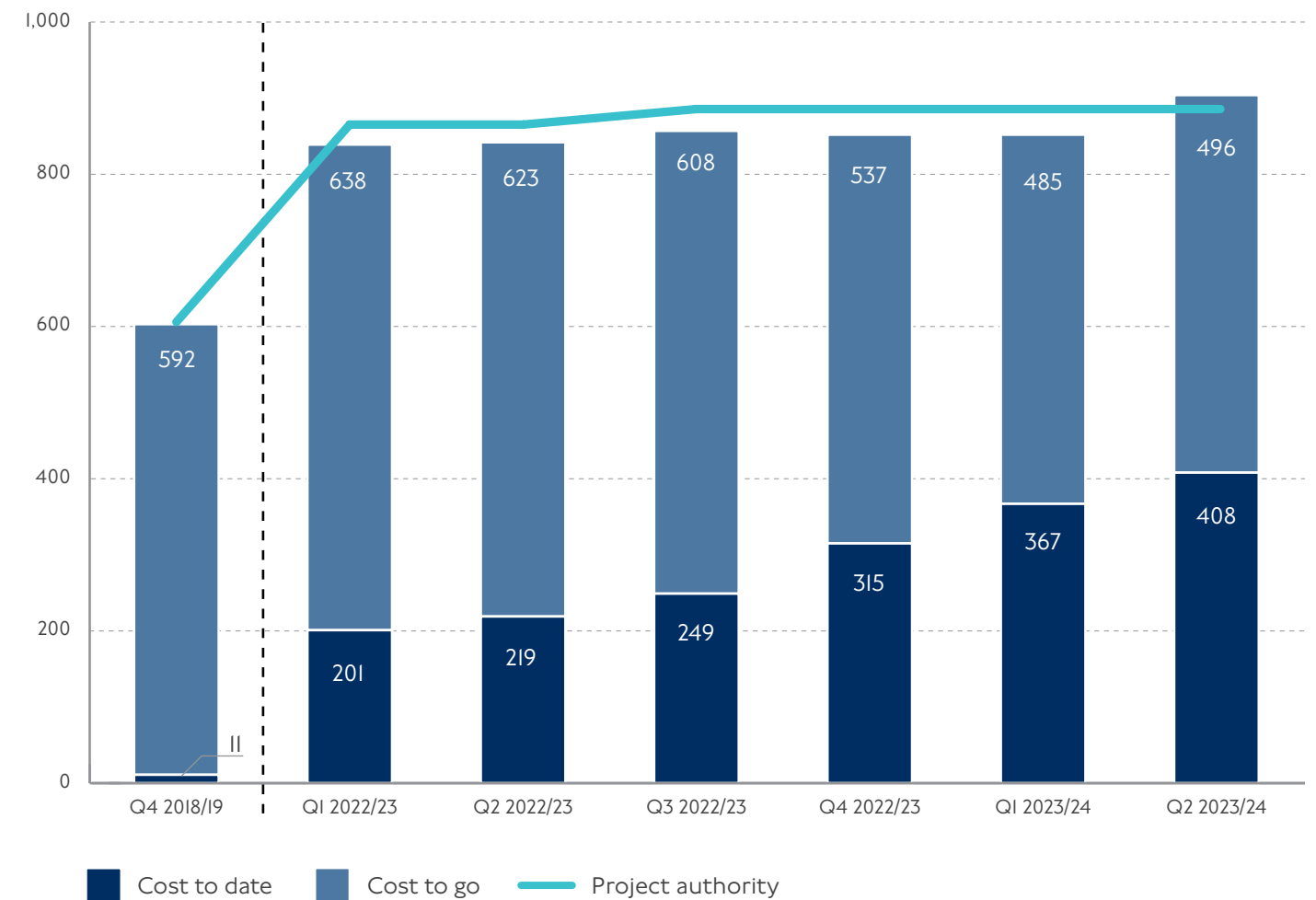
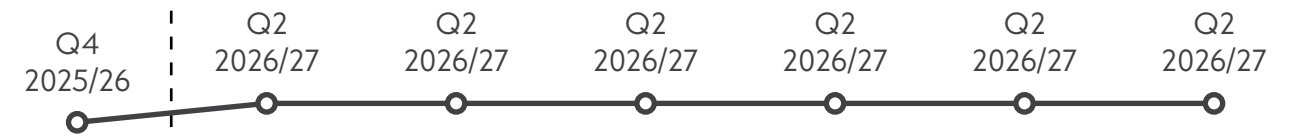
Since the Programme and Project Authority was granted in 2019, we have received approval from the Government to purchase 11 additional trains funded through the Housing Infrastructure Fund.

The increase in EFC from Quarter 4 2018/2019 reflects the addition of £261m of grant funding from the Government to deliver the Housing Infrastructure Fund scope of works.

The EFC in Quarter 2 2023/24 reflects the insolvency of the Principal Contractor delivering infrastructure works at Beckton depot and the reassessment of the likely outturn cost of all remaining works across the entire programme, including estimates for unprocured scope and future inflationary allowances.

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, with 22 trains completed. Main line testing is also progressing and signalling integration testing of the onboard vehicle signalling control system is under way. We expect the new trains to begin entering passenger service in early 2024.

Beckton depot and network infrastructure

On 17 August 2023, Buckingham Group Contracting Ltd, the principal contractor for the Beckton depot Northern Sidings contract, filed notice of intention to appoint administrators. Buckingham Group suspended works on site and stood down its subcontractors. We enacted a Safe Stop of the works to ensure the site was left in a safe and secure condition. Buckingham Group has now entered administration with no buyer found for this contract.

This will delay commissioning of the Northern Sidings and start of the main works on site for the new maintenance building but is not expected to impact the introduction of new trains into service in early 2024 as alternative stabling options are being explored. We are currently in the process of implementing alternative arrangements to complete these works.

Following the award of the contract for the maintenance facility building and southern sidings, our contractor has now fully mobilised and works are progressing in readiness for commissioning following the northern works completion.

Following the award of the design and build contract for the second entrance at Blackwall, intrusive surveys have been undertaken and detailed design is nearing completion.

The first power resilience contract has been awarded and design has begun. We have found synergies on the delivery of these works which will enable us to reduce the number of closures of the railway, minimising impacts to our customers.

Green agenda

Works are progressing to implement changes in the train control software to reduce the amount of fixed power assets required to support the new trains.

This will reduce embedded carbon in construction and provide an energy saving over the lifespan of the train.

Initial works have begun and a full quantification of carbon savings will be detailed in the next quarter.



We have built 22 new DLR trains

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	786	2,264	3,050	2,994	(56)
Change since last Investment programme report					
No change	67	58	125	No change	

Financial commentary

A full update was provided in the annual programme review submission to the October Programmes and Investment Committee, which highlighted the current risks and challenges faced in the delivery of the Piccadilly line upgrade programme and how we are responding to them.

In Quarter 2 2023/24, the EFC increased by £125m to £3,050m, which now exceeds the authority value of £2,994m. While a view has been taken of the known new risks and challenges, it is not proposed to seek an increase in Programme and Project Authority at present until the conclusion of extensive work that is under way on alternative delivery plans, mitigation measures and opportunity development to inform the Stage I EFC position. The outcome of this review will be reported to the Committee in March 2024.

Performance over time commentary

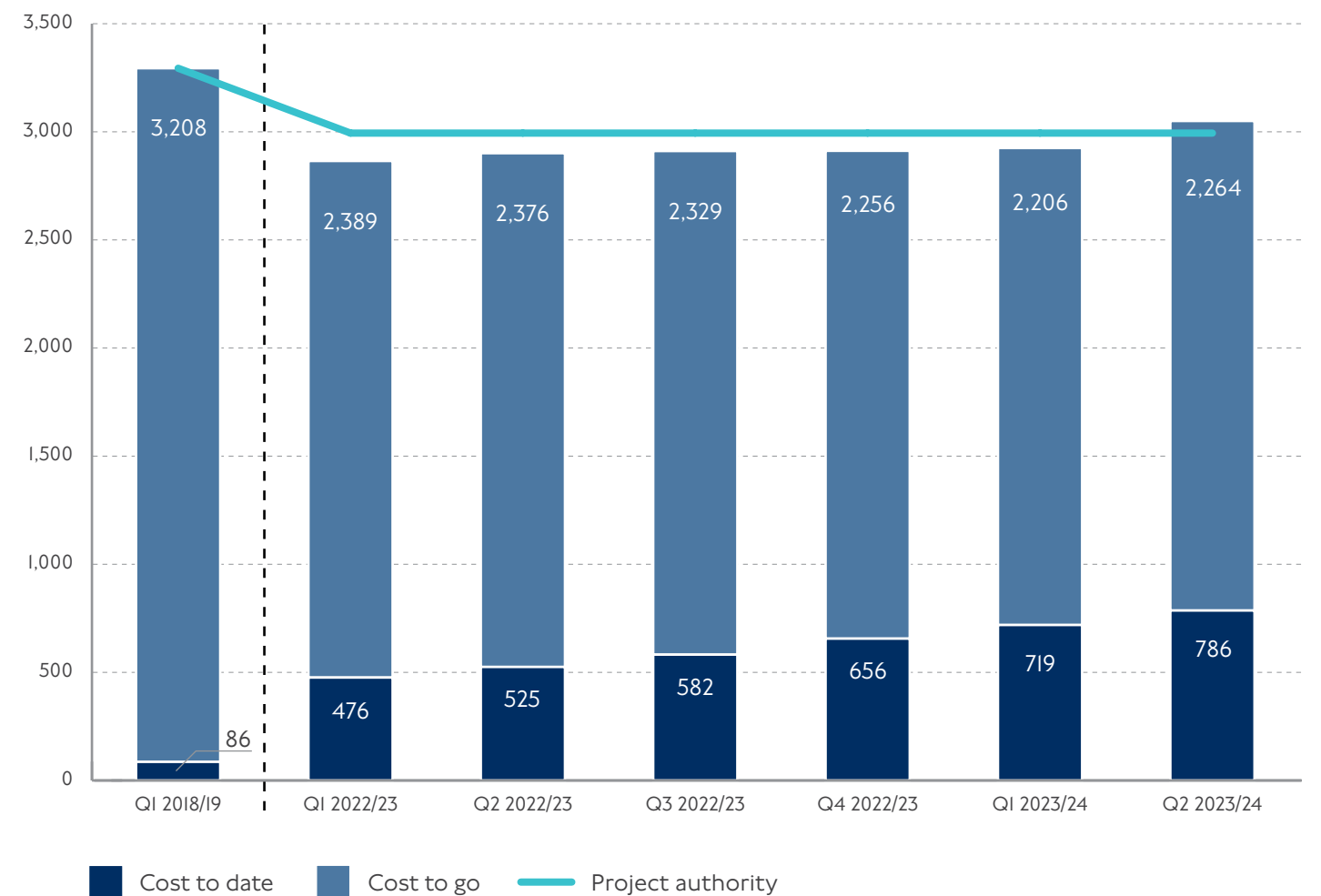
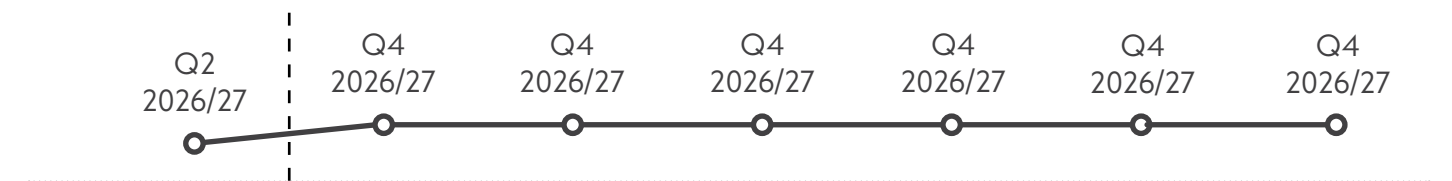
Since October 2022, the EFC has been under pressure from increasing base costs due to emerging scope in the depot upgrades, industry price increases and

indexation. Additionally, programme risk and uncertainty provisions have increased within the EFC to reflect schedule extensions in depots and the impact of resourcing challenges that we have experienced.

A range of opportunities have been identified which are expected to reduce pressure on the Stage I EFC including the revised delivery approach for the depot upgrades and improved risk management. A 'dynamic EFC' approach is being taken and a partially mitigated EFC of £3,050m is reported at the end of Quarter 2, 2023/24 (£56m above the current authority). Efforts are now focused on achieving greater certainty around the delivery schedule and costs, with no intention to see an increase in authority until after these activities have been completed. We have now completed a scheme re-baselining exercise and are reviewing the EFC in response to this.

Estimated final cost performance over time (£m)

Forecast completion date



Programme update

Rolling stock

The manufacturing contract with Siemens Mobility Limited is progressing well, with the assembly and formation of the first complete train in Vienna taking place in spring 2023. The first fully assembled train has been transferred to Siemens' test and validation centre in Westphalia, Germany, where it is undergoing a programme of testing and pre-delivery performance and reliability proving prior to series production.

Despite the delivery schedule challenges to the enabling works, the programme currently remains on target to receive the first train in London for system testing on the Piccadilly line in summer 2024.

The Siemens' UK train manufacturing facility in Goole, East Yorkshire, has been completed. This facility is creating a significant number of career opportunities across the UK and will be complemented by an innovation campus for rail industry research and development. It is expected that approximately 50 per cent of the new Piccadilly line trains will be assembled at the new UK facility in Goole.

Enabling works for high voltage (HV) power

The first major work packages started as part of the Piccadilly line upgrade high-voltage power framework. The design and delivery of the critical sub-station equipment and distribution of the network upgrades required to support new train introduction began in spring 2023.

Enabling works are also under way at Manor House and Cobourg Street sub-stations in readiness for new high voltage equipment installation. Procurement of further batches of power system upgrade works within the supply framework has also started.

One-person operation closed circuit

System development of digital software and train equipment is progressing for the new one-person operation closed circuit TV system. Station system design and installation works are under way across the Piccadilly line, including the building of new equipment rooms. This system will improve safety through transmission of high-quality digital images of the platform-train interface to both the train operator and the line control centre to ensure the safe departure of the train from the platform.

Depots

The first stage of the train maintenance depot upgrades at Northfields and Cockfosters has begun, with the construction of three new sidings to the west of Northfields station. This will strengthen stabling capacity on the line and facilitate the extensive upgrade works to train maintenance facilities at Northfields depot, for which supply chain procurement is under way.

Following extensive site clearance, work is under way at Cockfosters depot to provide a new wheel turning facility for the new trains. This new construction is the first stage of the upgrade works for the depot to provide the maintenance, servicing and stabling facilities needed for the new fleet.

Good progress has been made with procuring the Tier I supply chain to support us with the detailed design and build of the end state maintenance facilities at both Northfields and Cockfosters.

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 employees to attend carbon literacy training courses to support the delivery of carbon savings within the programme. Work continues on revising the carbon baseline to reflect a developing understanding of programme scope and design.

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)
Q2 2025/26	118	57	175	173	(2)
Change since last Investment programme report					
No change	1	(5)	(4)	No change	

Financial commentary

Following the full update at the October Programmes and Investment Committee meeting, the EFC is currently £2m 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 EFC has decreased by more than £4m since the last report owing to several significant risks being reduced after the successful completion of the main tunnelling works. We continue to seek opportunities to reduce cost and risk exposure, which should be achievable to bring us back in line with authority.

Performance over time commentary

The forecast end date is when the permit from an independent assessor to use the new Silvertown Tunnel is obtained. Following the full update at the October Programmes and Investment Committee meeting, the planned permit to use

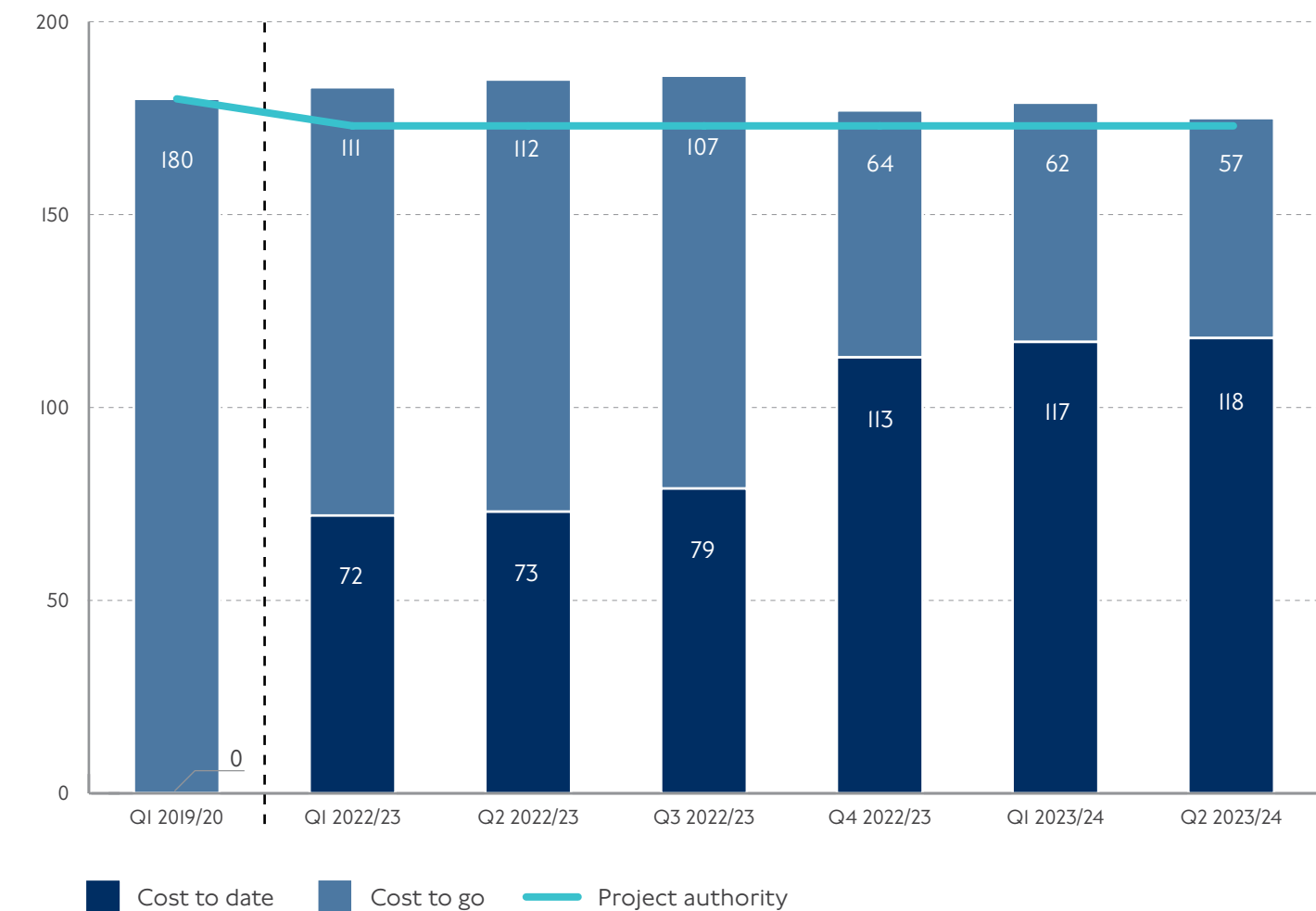
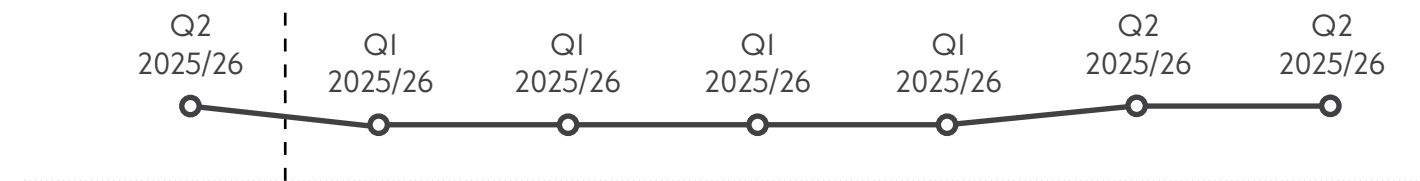
remains in Quarter 2 2025/26, but together with Riverlinx, we continue to review this with the aim of bringing the date back to Quarter 1 2025/26.

Programme update

The tunnel-boring machine completed its drive on 23 July, 62 days ahead of plan. This was a significant achievement for the programme as it represents successful completion of a complex machine manoeuvre and is the first time this technique has been used in the UK. In October, the Riverlinx consortium won the Temporary Works Initiative of the Year at the 2023 British Construction Awards for this solution. The tunnel-boring machine has now been dismantled and it was removed in September.

Estimated final cost performance over time (£m)

Forecast completion date



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

The new Boord Street walking and cycling bridge across the A102 was opened to the public on 20 June 2023 with a temporary ramp on the northside, which will be in place until the bridge is completed by December 2023. The new bridge provides a safe and easily accessible crossing on the Greenwich Peninsula for people walking and cycling, including cargo bikes, and it will accommodate future neighbouring development proposals. The demolition and removal of the old bridge was completed in early August 2023 and work is now progressing to install the permanent ramp on the northside.

Works continued on the A102 road following several productive weekend closures and the southbound overbridge, which crosses over the new tunnel approach road, came into effect in October 2023.

Green agenda

The introductory cross-river bus network for Silvertown Tunnel was finalised in March 2023 and following a competitive tender process over the summer was awarded to Go-Ahead London in September 2023. The network includes routes 108 (the existing service using Blackwall Tunnel), 129 and SL4, which forms part of the wider Superloop network.

They will begin operating when the Silvertown Tunnel opens in 2025. We will be working to deliver a zero-emission bus fleet across all three routes. The consultation for the cross-river cycle provision closed on 10 September 2023 and we received more than 680 responses. We are in the process of analysing those responses before deciding on the next steps.



We are ensuring that multiple bus routes can use the tunnel

Network extensions

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	693	8	701	702	1
Change since last Investment programme report					
No change	6	(5)	1	No change	

Financial commentary

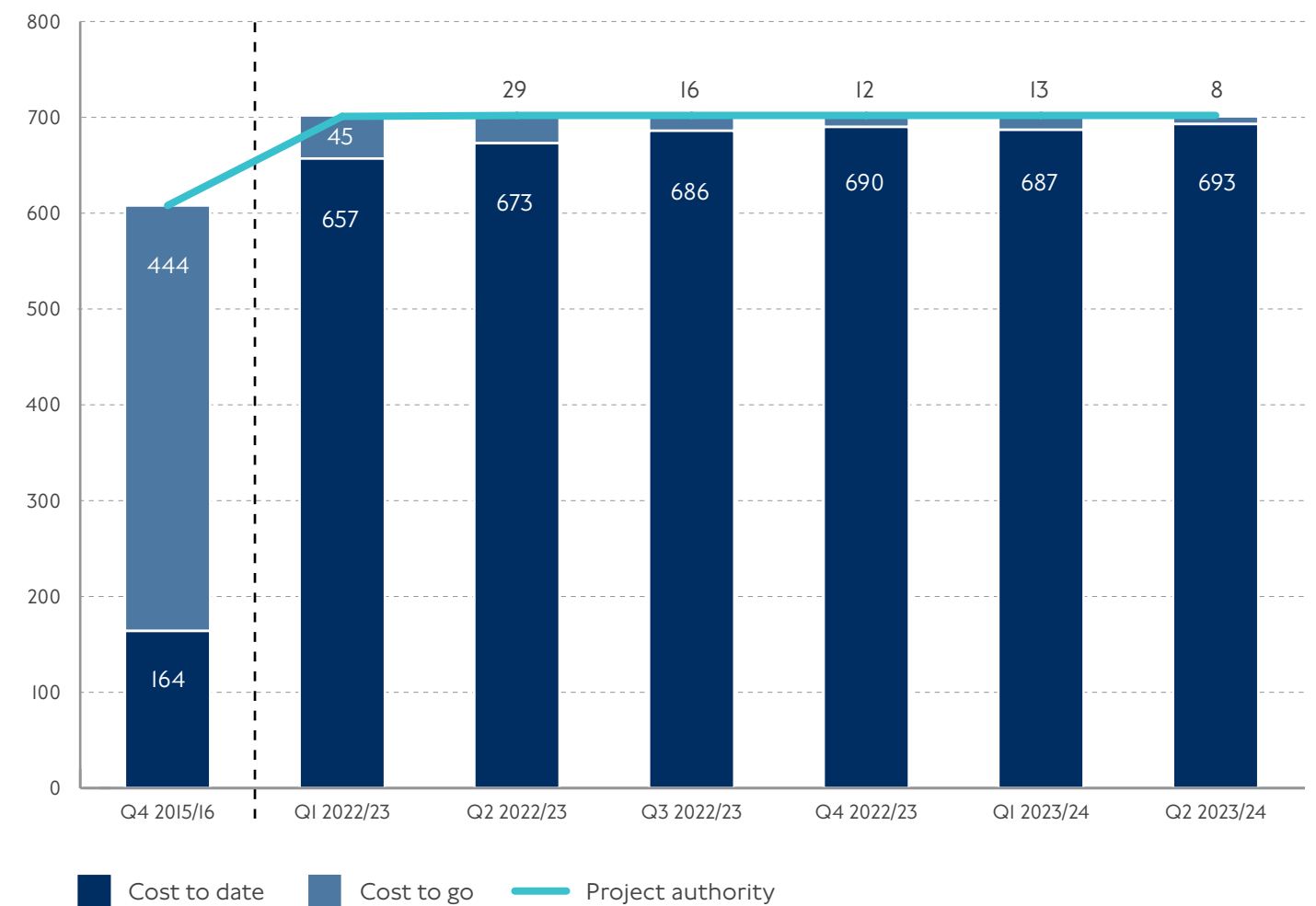
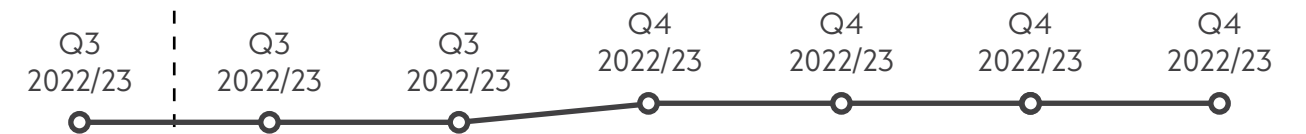
The EFC has remained stable during the last year with only minor movements associated with a dynamic EFC. Remaining spend remains in line with current forecasts, and within Programme and Project Authority of £702m.

Performance over time commentary

The forecast end date represents the opening of the new Cannon Street ticket hall entrance at Bank station, which was achieved on 27 February 2023. 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 coronavirus pandemic. In addition, the final phase of the programme was delayed by around three months owing to issues relating to the manufacture and installation of cladding panels and commissioning of safety-critical systems.

Estimated final cost performance over time (£m)

Forecast completion date



Programme update

This project has increased the station's capacity by approximately 40 per cent. It has also resulted in improved passenger flows and reduced journey times, enhancing the overall customer experience. Improvements include step-free access to and from the Northern line, improved access to and from DLR platforms, two new moving walkways, 12 new escalators and two new lifts to serve the Northern line and DLR. There are more direct routes within the station and a new station entrance on Cannon Street.

Since opening the new entrance on Cannon Street in February 2023, the project continues to progress through snagging, close-out works and finalising the assurance and handover process. Negotiations with the City of London Corporation continue. We are moving closer to securing the terms of a lease agreement to enable the backfill of the Arthur Street shaft to begin. Planning consent will be required prior to the backfill and we are engaging with the Corporation on this. An S278 agreement has been signed between parties for the City of London to carry out works on the crossing. Further works associated with the junction modifications between Arthur Street and both King William Street and Upper Thames Street continue to progress through design.

Green agenda

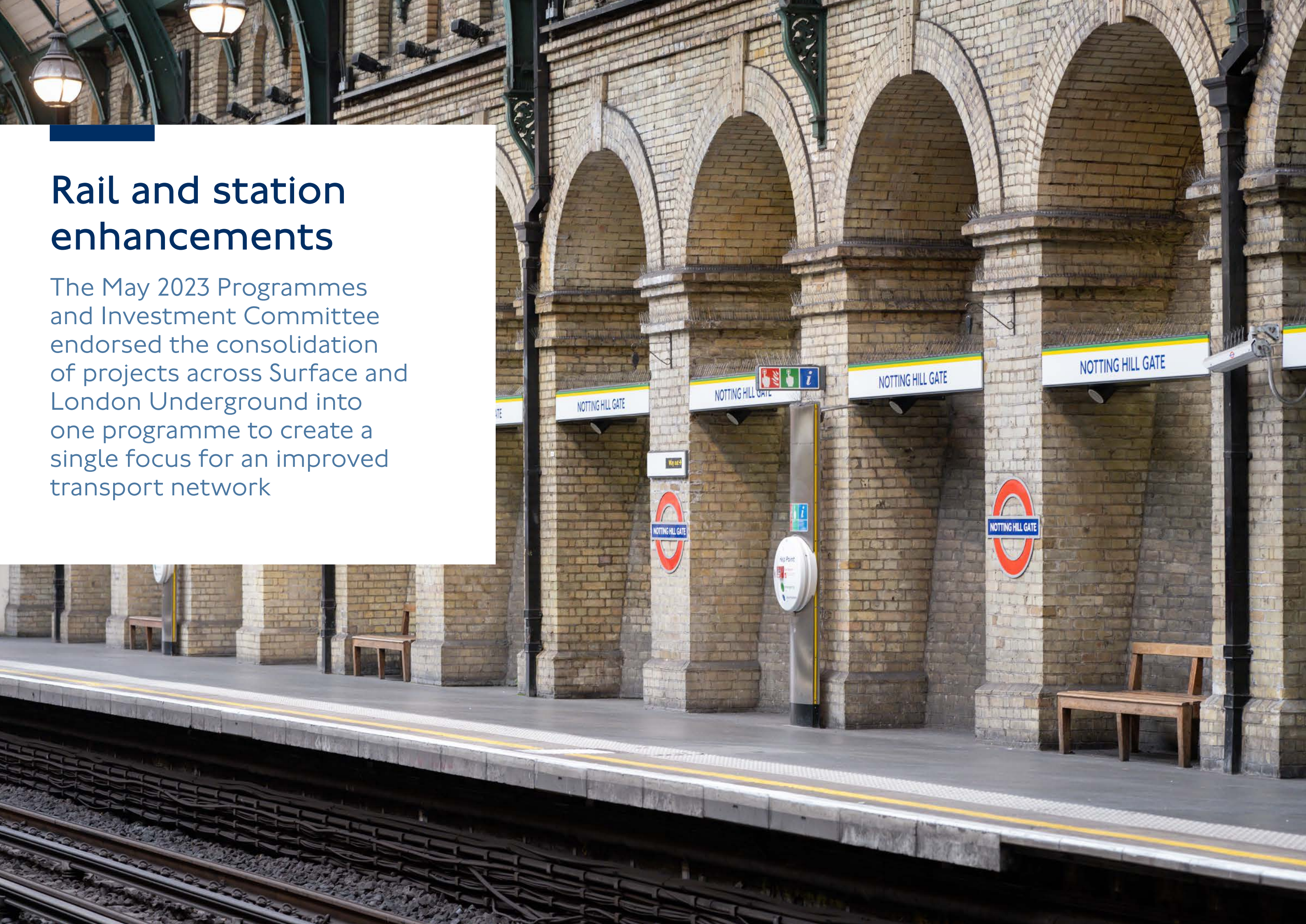
The project is nearly finished and will assist in sharing initiatives and output data to support developing and refining strategies and aims of our green agenda. Strategies undertaken around environmental requirements and carbon-reduction targets will be reviewed and shared.



Step-free access is a key part of our infrastructure

Rail and station enhancements

The May 2023 Programmes and Investment Committee endorsed the consolidation of projects across Surface and London Underground into one programme to create a single focus for an improved transport network



Rail and station enhancements

Forecast period	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and Project Authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	78	237	315	1,022	707
Change since last Investment programme report					
No change	6	(21)	(15)	20	

Financial commentary

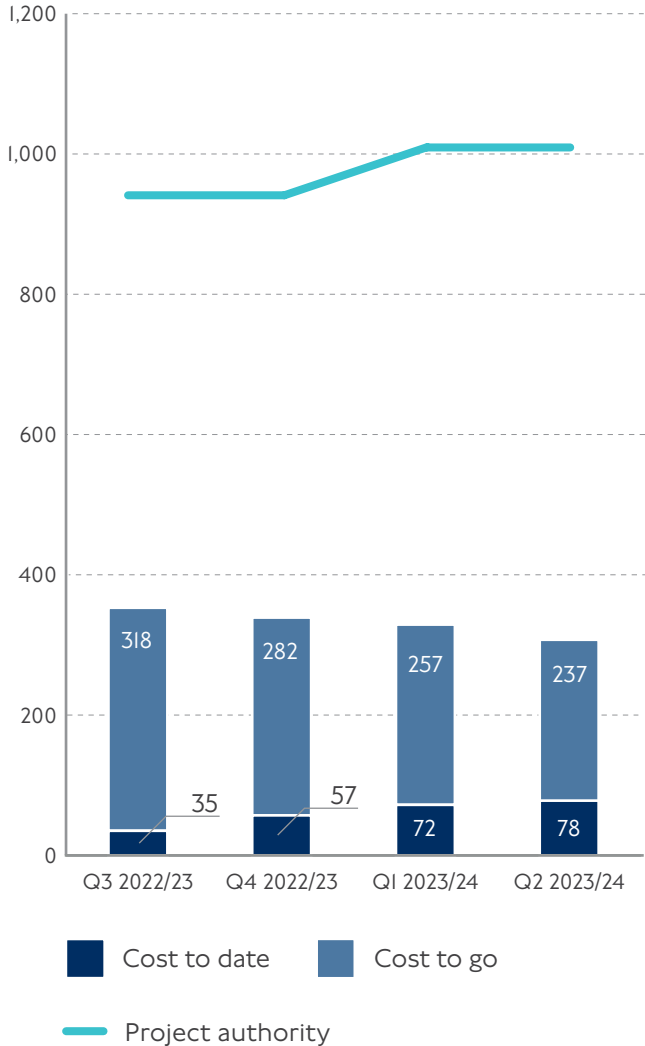
A £20m additional authority was approved at the July Programmes and Investment Committee meeting allowing us to carry committed enhancements work across the portfolio. The forecast between 2022/23 and 2025/26 has increased by £16m, predominantly driven by rephasing of tram replacement costs due to delay to the award of the depot concept design. This is partially offset by the East London line Housing Infrastructure Fund (phase one) programme with an estimated final cost increase of £4.4m following a deep dive of the risk on the Surrey Quays station upgrade.

There has not been any change in the spend or completion dates for delivery across other areas.

Performance over time commentary

The total cost shows little movement from the previous quarter but there has been good progress in conversion of the £5m of cost to go into spend to date., when compared with Quarter I. Some delays have resulted in spend moving into later years. Increased authority recognises the longer-term forecast for the portfolio.

Rail and station enhancements performance over time (£m)





Rail and station enhancements

High Speed 2

Since the Department for Transport's (DfT) announcement in March that it will pause construction at Euston station and 'rephase' its delivery, we have engaged collaboratively with High Speed 2 (HS2) Ltd and other Euston Partnership members, including Network Rail, DfT, London Borough of Camden, GLA and Lendlease, as the masterplan development partner, to look at options to reduce costs. This resulted in HS2 Ltd delivering a high-level feasibility report to the DfT with several options for further investigation. However, on 4 October 2023 the Prime Minister announced that while HS2 would continue to Euston, a smaller and privately funded station was proposed, together with provisions for up to 10,000 new homes. A document was then issued by the DfT later that day entitled Network North which provided some additional detail, including the following statements:

'We will not provide a tunnel between Euston and Euston Square Underground station or design features we do not need.'

'We will deliver a six-platform station which can accommodate the trains we will run to Birmingham and onwards.'

'We will appoint a development company, separate from HS2 Ltd, to manage the delivery of this project. We will also take on the lessons of success stories such as Battersea Power Station and Nine Elms, which secured £9 billion of private sector investment and thousands of homes.'

The document goes on to state that the full £6.5 billion saved through the Government's rescoped approach at Euston will be reinvested across the country.

The Prime Minister's announcement and the DfT publication was made without prior engagement with us or the GLA. We are therefore seeking urgent clarification on a number of matters, in particular the implications on our operations, assets and passengers. It will also impact the protective provisions agreement that we have in place with the DfT that safeguards our requirements for matters such as the provision of a London Underground station and Euston Square link to accommodate forecasted passenger demand.

With Old Oak Common becoming a terminus for HS2 services for up to a decade, we have made the case to the Government to procure additional class 345 Elizabeth line trains to ensure sufficient capacity for passengers coming from HS2 services to continue their journey into central London. In addition, we are engaging with HS2 Ltd, Network Rail and the DfT to try to resolve the issues of level boarding for Elizabeth line rolling stock and those discussions are ongoing.

Green agenda

Our environmental requirements and carbon reduction targets for new or altered assets are already incorporated into the functional requirements in the Programme and Project Authority and have been cascaded to the HS2 Ltd supply chain.

Rail and station enhancements

Elephant & Castle

A new station entrance and Northern line ticket hall will support the creation of 5,000 new homes and 10,000 new jobs in the area around Elephant & Castle station. This new entrance will significantly increase the station's capacity to meet both existing and new demand for Tube services.

We are progressing with the procurement arrangements for the new tunnels, with four companies receiving an invitation to tender in July 2023, after a successful pre-qualifying exercise. A contract for essential pre-tunnelling ancillary works was awarded and works are progressing well on site. Other enabling works have been undertaken and proved cost effective due to using specialist in-house resources.

These works, plus the station box, are known as stage one works and are fully third-party funded. Construction of the station box by the developer continues, with station-box piling completed and works on the slab have started. The developer has completed the construction to Basement Level 5, and we are considering the provision of 'soft eye' construction (a soft eye provides an easier way to break through than traditional concrete and steel piles) to enable a future Bakerloo line extension through this new facility. Handover of the station box by the developer remains set for spring 2025, as planned.

We have concluded the package of works to determine the options for the eventual fit-out of the station box and tunnels, and for bringing the new station entrance into use. These works are known as stage two and are, as yet, unfunded. A plan has been developed to ensure this critical aspect of the project is considered as part of our future funding decisions.

Green agenda

Environmental requirements have been incorporated into tunnelling package contract documents, supported by the Environmental team.



Our Environmental team helps inform our planning



Rail and station enhancements

East London line enhancement programme

Balfour Beatty have been procured to deliver the signalling enhancement to the East London line Housing Infrastructure Fund programme, and the detailed design for this work is complete. Procurement of the necessary TfL power infrastructure reinforcement has concluded, with works scheduled to begin in late 2023. We continue to collaborate with Network Rail on reinforcing their power infrastructure to provide further resilience to the East London line to support future increased train frequencies.

Rail and station enhancements

Surrey Quays

Our main contractor, Morgan Sindall Infrastructure, continues to progress the detailed design of the Surrey Quays station upgrade with the detailed design recently achieving 90 per cent completion. Enabling works, including the diversions of utilities both inside and outside the rail corridor, have begun. Modification of site welfare, project offices and the construction compound began in October 2023. While the project teams continue to work collaboratively and are co-located in our offices, the focus is on the safe delivery of essential railway closure works in November and December 2023.



Safety is at the heart of our on-site works



Rail and station enhancements

Tram replacement rolling stock

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.

Following a recent assurance review, the intention is to release a contract notice to the market by the end of the calendar year. Design development for the depot and power interventions will continue this financial year.

Rail and station enhancements

DLR

DLR Thames Wharf

Feasibility and value engineering have now concluded for a new station at Thames Wharf in line with the revised masterplan for the Thameside West development.

The next phase of work on the scheme would be to tender for and complete concept design, but this is dependent on further discussions with the GLA as the project is currently third-party funded by the Royal Docks Enterprise Zone. We will seek further Programme and Project Authority from the Committee when further third-party funding is secured.

DLR Royal Docks

The GLA-funded Royal Docks station programme is aligned with the emerging aspirations of the Royal Docks and Beckton Riverside Opportunity Area Planning Framework. This framework aims to improve accessibility and reduce congestion to enable the delivery of an additional 3,000 homes.

The programme has completed concept design for capacity enhancements at Pontoon Dock. We are undertaking elements of redesign to mitigate increasing costs to realise value engineering savings.



We are improving accessibility at Royal Docks station

Rail and station enhancements

London Underground

The London Underground enhancements and station developments project covers a range of improvements, 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. Throughout Quarter I, we made good progress, achieving notable milestones such as completing the demolition and sterilisation of a derelict warehouse at Acton depot.

Step-free access

A prioritised list of stations to undertake feasibility and design for step-free access has been developed and was formally announced on 11 July 2023. The stations are Alperton, Arnos Grove, Burnt Oak, Eastcote, Finchley Road, Northolt, North Acton, Rayners Lane, West Hampstead and White City. These are in addition to the schemes at Colindale and Leyton already in progress. Both Burnt Oak and Northolt previously had design and construction work paused during the pandemic and so the focus is on updating the costs and construction programmes to inform deliverability.

We have written the scope of works for the next phase of design. The procurement of this next stage has concluded and supply chain partners have started the design process, including asset surveys, construction planning and providing cost information.

A preliminary study into the provision of step-free access on the southern end of the Northern line has also begun. Outputs from this and the 10 stations listed above will be available in early 2024 to inform investment decisions for 2024/25. We also continue to

actively engage local authorities, developers and businesses in other areas of London to explore what options are available to introduce further step-free access to stations. Feasibility work at other stations could be progressed should the right amount of investment be provided by these organisations.

Waterloo – Elizabeth House

We continue to finalise legal agreements to ensure step-free access to the Northern line platforms is secured before the redevelopment of Elizabeth House is completed. This would involve constructing lift shaft structures and connections to the northbound platforms during the development works. The work would enable the future fitout of the lift shafts.

Paddington – Bakerloo line

We are working with a third-party developer to deliver a new step-free ticket hall at the Bakerloo line. Installation of cabling, services and finishes for the new ticket hall and step-free access areas continues to take place.

Colindale

Following the announcement in January 2023 that the GLA was successful in provisionally securing funding from the Government's Levelling Up Fund, we have submitted draft business case documents to the DfT for feedback and are aiming for final submission by mid-November 2023. Programme and access requirements, and the associated preconstruction and governance processes, are being updated ahead of getting project authority to proceed with letting the construction contract in December 2023. Work is programmed to begin on site in early 2024.

Knightsbridge

The project is currently forecast to deliver step-free access from the new Hoopers Court entrance by spring 2024. We are actively working to accelerate the remaining delivery sequencing, and successfully utilised the recent track closures to undertake critical works that interface with the existing station.

London Bridge

We have been notified that the Secretary of State has turned down the planning appeal by the developer of the New City Court site, which would have included a new station entrance at Borough High Street. As a result, the developer will not be proceeding with the scheme and therefore all our further engagement will cease other than to allow the project to be closed.

West Ham

We are working with a third-party developer, Berkeley Homes, to build 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 started in summer 2022. Progress in 2023 has been slow due to complexities in closing out several design matters which could only be addressed once Berkeley Homes appointed their principal contractor. Good progress has now been made in resolving these design matters and the superstructure works are expected to begin in January 2024. It is anticipated that the new ticket hall will open in July 2025, however this is dependent on the wider site works.

Stratford

Construction works are under way in delivering the urban realm and new southwestern station entrance. Piling for the new entrance is completed and we have begun works to convert the existing Tube car park to an urban area.

We remain in close communication with funders of the scheme, London Legacy Development Corporation and London Borough of Newham as the works proceed. The project is forecasted to finish in March 2024 and we are working to identify actions to complete it ahead of schedule.

The project continues to liaise closely with the Network Rail project to deliver a new customer lift connecting the Jubilee line concourse to the western subway. An agreement has been signed for the provision of technical assurance to London Underground by Network Rail to support delivery of the project. Network Rail is in the process of final planning and procurement for the delivery phase of these works.

Leyton

Following the announcement in January 2023 that the GLA was successful in provisionally securing funding from the Government's Levelling Up Fund, we have submitted draft business case documents to the DfT for feedback and are targeting final submission by mid-November. The project began the detailed design stage in July 2023 as planned, using an initial £2.6m grant from the Government. Construction is due to start in Quarter I 2024/25, subject to Government approval of the business case.

Safe and healthy streets

This programme includes bus enhancement projects that were previously part of the Public Transport portfolio and Healthy Streets projects. It provides a single focus for investment in Healthy Streets and enhancements for bus users



Safe and healthy streets

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and Project Authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	203	477	680	817	137
Change since last Investment programme report					
No change	40	(58)	(18)	44	

Financial commentary

Our Safe and healthy streets capital programme continues to be in line with the funding settlement conditions agreed with Government over the two-year period for 2022/23 and 2023/24. We will continue to provide funding to London boroughs for investment in their streets, although this is accounted for as operating expenditure. The total investment in active travel, across both operating and capital expenditure, is an average of £150m per year net of income across our Business Plan 2022/23 to 2025/26.

Investment in Quarter 2 was £40m, which represented an eight per cent acceleration in investment since Quarter 1 although still slightly below Budget for the quarter owing to slower than expected remobilisation of resources and our supply chain following the coronavirus pandemic. We are closely monitoring our delivery and fully expect to meet our commitments.

While forecast costs over the period to 2025/26 have reduced by £18m as some projects have been delayed beyond this timeframe due to prioritisation or external factors, the overall scope of the portfolio remains unchanged.

Performance over time commentary

Following the Government funding settlement and the TfL Board agreement of the 2022/23 to 2025/26 Business Plan, investment in Safe and healthy streets has continued to increase each quarter. This includes continued investment and commitment to deliver the walking and cycling, bus and Vision Zero action plans.

Programme update

The Safe and healthy streets programme continues to reduce road danger in line with the Mayor's Vision Zero goal, 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.

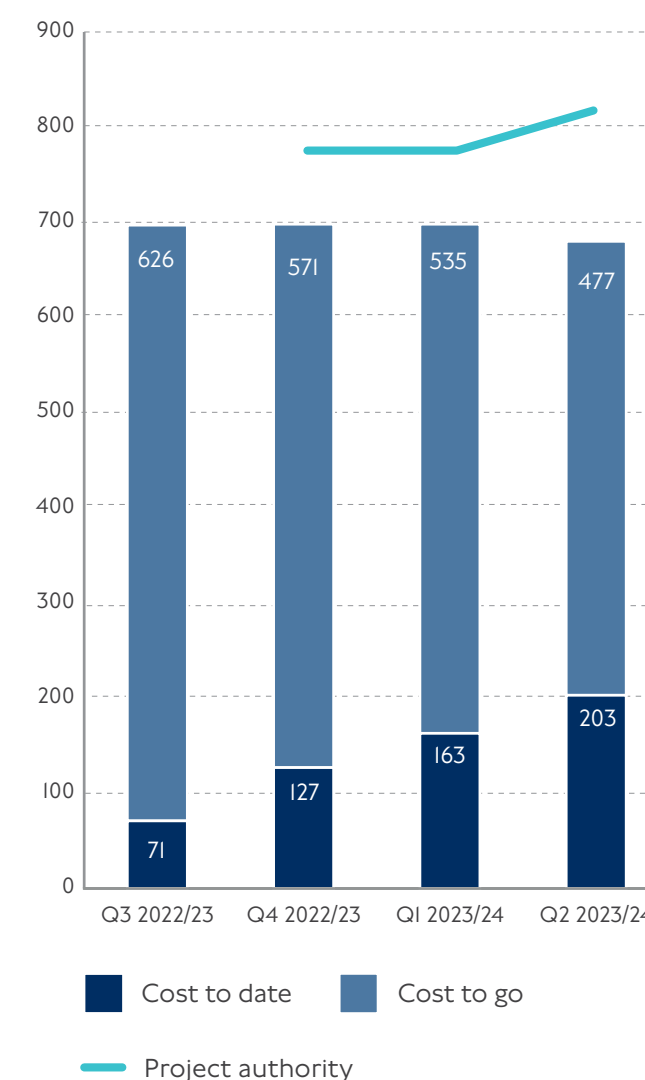
Recent highlights across the programme include completion of works to upgrade the temporary schemes installed as part of London's response to the coronavirus pandemic. These include the replacement of the temporary blue barriers with a trial of semi-permanent materials on Borough High Street and the A21, and improvements along the route of Cycleway 9 on King Street and Chiswick High Road. We also decided to retain the trial upgrades to Cycleway 8 permanently.

Work carries on with a transformational scheme at Tolworth, where improvements will make better provision for cyclists, pedestrians and bus passengers, while also supporting the growth in travel associated with a new housing development and Lidl's new European headquarters.

Construction carries on with an experimental cycling scheme (Cycleway 50) on the A503 Nag's Head gyratory, to connect cyclists to a route in Camden. We also continue to construct cycle lanes around Lea Bridge roundabout as part of Cycleway 23 and the final section of Cycleway 4 in Southwark, with these schemes completing over the winter.

Construction has been completed on the next section of Cycleway 9 linking Kew Bridge to Watermans Park. We have also begun a project to deliver critical safety improvements on the A4 Bath Road, and along Holloway Road.

Safe and healthy streets performance over time (£m)



Safe and healthy streets

Old Street station and roundabout

The Old Street roundabout project will bring safety improvements for cyclists and pedestrians by providing new and improved crossings, fully segregated cycle lanes and a new public space with an accessible main entrance to Old Street Underground station and the sub-surface shopping arcade.

Construction of the superstructure for the new London Underground main station entrance has continued with the ceiling installation and stairs tiling completed, including removal of the temporary scaffolding. Works are now progressing on the internal finishes. Completion of the superstructure works is scheduled for January 2024.

Works have also continued in the peninsula area with installation of new sustainable drainage systems and hostile vehicle mitigation bollards completed.

Final paving and urban realm works have also started and are progressing well. Cladding of the existing clerestory building structure and replacement of the roof skylights continues. All works will be completed by early 2024.

Construction of the new passenger and goods lifts have been completed ahead of standalone testing from January 2024. Refurbishment continues of the subsurface concourse area with installation of new mechanical, electrical and communications equipment. Delivery and installation of the new fire doors and shop fronts is expected to be completed by January 2024, but the team are looking at opportunities to bring this forward.

Construction completion is forecast for early 2024.



The new roundabout prioritises the safety of cyclists



Safe and healthy streets

Cycling infrastructure

Cycleway 4 - London Bridge to Greenwich

The London Borough of Southwark is continuing to construct the temporary scheme for Lower Road 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

The construction work for a new segregated cycleway between Kew Bridge and Waterman's Park is now complete and connects the area with Chiswick, Gunnersbury and Hammersmith.

The next section, Watermans Park to Brentford Magistrates Court, started on 23 October 2023 as planned (both are under delivery by the London Borough of Hounslow's contractor).

Cycleway 23 - Lea Bridge to Dalston

Construction of segregated cycleways around Lea Bridge roundabout began on 13 March 2023 and works are progressing well with all islands and significant utility diversions completed. Construction of Lea Bridge Road started as planned on 24 July 2023 and is being delivered by the London Borough of Hackney.

Cycleway 37 - Mile End to Westferry Lane

Work to deliver the permanent scheme at Mile End Road junction was due to begin in February but the London Borough of Tower Hamlets does not agree with elements of the proposals and consequently has not signed a section 8 agreement permitting the works. We are in ongoing discussions with Tower Hamlets to find a suitable resolution for this safety critical scheme. Until this is resolved, construction is delayed. The deliverability of the remaining sections, including the temporary-to-permanent scheme on Burdett Road, is being reviewed.

Cycleway 50 - Finsbury Park to Tottenham Hale

Construction of the section on our roads from Caledonian Road to Finsbury Park started on 20 February 2023 and is progressing well. Works on Isledon Road are complete and work is under way on Tollington Road and Seven Sisters Road.

Safe and healthy streets

Vision Zero

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 Vision Zero progress report published in 2021, aims to provide a 20mph speed limit on 220km of our roads by May 2024. To date, we have delivered a 20mph speed limit on 144km of our roads.

In Quarter 2, we completed works to deliver raised crossing points in the City of Westminster to complement the 20mph speed limit in the borough; a new 40mph speed limit came into force on 1.8km of the A4 Bath Road in Hillingdon; and pedestrian safety measures and a new 20mph speed limit was introduced in West Wickham town centre in Bromley.

Works are now under way to lower the speed limit to 20mph on sections of our roads in the boroughs of Kensington and Chelsea, Greenwich and Lewisham. We will soon be starting speed limit reduction works in Southwark, Lambeth, Wandsworth, Merton and Ealing.

Mounted banners on lamp columns have now been installed across these corridors to help raise driver awareness of the new 20mph speed limit and a radio and digital advertising campaign has been launched to complement the changes.

Detailed design is under way to lower the speed limit to 20mph on selected roads in the boroughs of Greenwich, Newham, Wandsworth, Richmond, Sutton and Merton, and on the A312 Harlington Road in West Hounslow. A new 30mph speed limit is proposed on the A4 Great West Road in Hounslow. A new 40mph speed limit will also be introduced on the A406 North Circular Road in Enfield and Waltham Forest. These projects are scheduled for delivery by March 2024 and will complete phase two of our Lowering speed limits programme.

Outcome definition work is taking place on identifying where complementary speed reducing features such as green infrastructure, lane reallocation and raised crossing points can be installed to provide a self-enforcing speed limit where it has recently been introduced, in line with DfT guidance on setting speed limits.

Safer Junctions programme

In April 2017, the Safer Junctions programme highlighted 73 of the most dangerous junctions on our roads, defined as those with some of the highest rates of collisions involving vulnerable road users. We have made improvements at 44 of these junctions. Construction work continues on the Holloway Road/Drayton Park Safer Junction scheme. The first phase of these works at the junction of Hornsey Road/Hornsey Street was completed in early September. Works now continue at the Drayton Park/Palmer Place junction, with the scheme due to be completed in spring 2024.

Further design and survey work is continuing at pace on the Battersea Bridge Safer Junction scheme following the tragic cyclist fatality on the bridge in August 2023.

We are continuing with design and outcome planning work on the remaining Safer Junctions and are committed to public engagement on potential changes to 10 further Safer Junctions by the end of 2024.

Pedestrian safety

Design work continues on more than 40 schemes across London, at locations where there is an identified road safety concern.

Construction was completed in early September on a scheme on the A10 at Edmonton County School in Enfield to improve the safety of entrance and exit movements.

Construction began in early October at the junction of A205/Lancaster Avenue in Lambeth to improve a pedestrian crossing and reduce vehicle speeds. Construction of a new pedestrian crossing in Grosvenor Place in Westminster is planned for delivery in January 2024.

In 2024/25, we plan to deliver safety improvements at a number of locations, including Kings Cross, A23 in Lambeth, Redcliffe Gardens in Kensington and Chelsea, A5 Edgware Road in Westminster. All of these are subject to further design, funding and approvals.

Safe and healthy streets

Bus priority

We continue delivery of new bus lanes, contributing to a target of 10km by spring 2024. To date, 4.4km has been delivered on borough and TfL roads, with further schemes moving to construction in autumn 2023. Signal timing reviews have been completed at a total of 712 sites to provide additional priority for buses, exceeding a target of 700 for the year well ahead of schedule. As of March 2023, 68 per cent of buses approaching traffic signals either arrive on a green signal or receive some form of bus priority.

More than £10m of funding has been allocated to London boroughs to deliver enhanced bus priority on their local borough road networks. As well as new bus lanes, this investment will deliver other bus priority features such as new bus gates, the removal of pinch-points and changes to the operating hours of bus lanes. The London Borough of Newham is now on site constructing a scheme that will provide 700m of new bus infrastructure, and the London Borough of Barking and Dagenham recently completed the delivery of more than 200m of new bus lane at Wood Lane.

We have identified a suite of activities to improve bus priority across the ten proposed Superloop routes. Improvements include traffic signal upgrades, new and improved bus lanes, and removing pinch-points. In some locations, a holistic corridor-based investigation is being progressed to focus on end-to-end bus priority. Signal timing reviews have already been reprioritised to include Superloop corridors.

Transformational schemes

We have been working in partnership with Lewisham Council to support their ambition to transform Catford town centre and improve transport in the area. We want to help the council create a greener town centre and ensure Catford is a pleasant place for people to live, work and visit.

To achieve this vision, we are proposing changes to the South Circular Road, which is part of the TfL Road Network, to make it easier and safer to walk, cycle and use the bus. The main change would involve moving Catford Road (part of the South Circular) to a new position on the site of the Canadian Avenue car park. We would also make the road system around Plassy Island two-way. These changes would provide improvements for all road users, including cyclists and pedestrians.

To fund this scheme, we are applying for finance through the DfT's Major Road Network fund. A business case was submitted at the end of last financial year, and we await the outcome of the DfT and HM Treasury's assessment of our proposals and case for change. We undertook public consultation on the proposals between 24 April and 5 June 2023.

Borough funding

We support boroughs to deliver a range of healthy streets improvements on local roads, including bus priority. We have allocated £63m funding for delivery in 2023/24. Recent achievements include:

- Westminster City Council has launched 11 School Streets
- Lambeth has completed 30 rain gardens in Low Traffic Neighbourhoods to provide floodwater drainage and support biodiversity
- Three cycleways through low-traffic streets in Ealing, Lambeth and Islington were introduced in April, with 10 being launched as part of the Summer of Cycling marketing campaign
- Cycle parking hubs at Highams Park, Chingford and Blackhorse Road stations have been installed by the London Borough of Waltham Forest
- A suite of bus stop accessibility improvements has been implemented in Brent, Ealing and Richmond
- More than 30km of new bus lanes have been identified for delivery on borough roads in 2023 and beyond

Safe and healthy streets

Bus safety

We published our Bus safety strategy on 7 September 2023, which sets out our vision for a safe and attractive bus network and aims to ensure that nobody is injured or killed on our bus network by 2041. We have successfully reached the milestone of having more than 1,000 buses in London's fleet meeting the Bus Safety Standard and we are continuing to make good progress with retrofitting technology onto the fleet.

We are now focusing on the next stages of the programme, introducing several safety features from the Bus Safety Standard onto vehicles that entered the fleet before they were mandatory, but still have a substantial number of years of London service ahead. This will enable them to deliver safety benefits which were not available at the point of manufacture. These upgrades include intelligent speed assistance, which automatically restricts bus speeds to local limits, and a camera monitoring system, which replaces mirrors with high-performance cameras to improve driver visibility and reduce blind spot.

Bus action plan

We published our Bus action plan in March 2022, which outlines how we will build and broaden the appeal of the bus service. This includes delivering a step change in customers' perceptions and experiences of bus travel, which can be achieved through offering better information and meeting expectations of a modern and comfortable experience at bus stops and on buses. We are currently developing our plans for the next stage of this work and will be establishing targets and milestones in the coming periods.



Our vision is for a safe bus network

Environment

This programme retains the structure of the Environment programme and includes the new green project pipeline that is being developed



Environment

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and Project Authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	228	367	595	954	359
Change since last Investment programme report					
No change	89	(216)	(127)	No change	

Financial commentary

The forecast cost has reduced overall by £127m since the last quarter, which is driven largely by a reassessment of requirements surrounding road user charging schemes.

In conjunction with this change, additional funding for £50m scrapage customer payments has been included. This follows the Mayor's announcement to open the scrapage scheme to all London households and additional scope identified within the delivery of the business operations in house for phase two of the Direct Vision Standard, as well as further reprofiling across the portfolio.

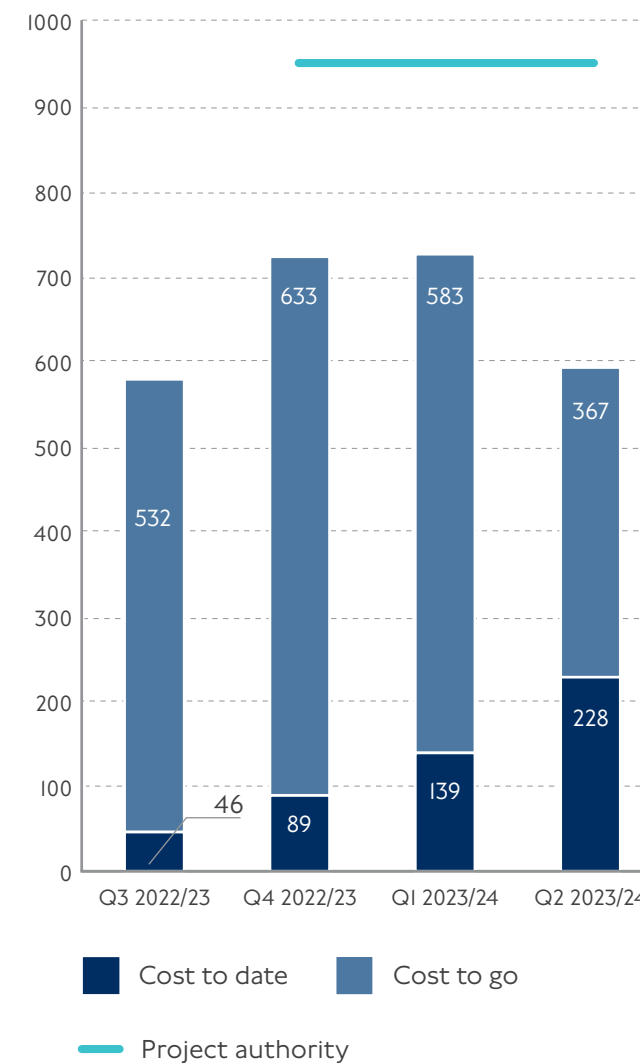
The Programme and Project Authority variance to forecast reflects the portfolio holding authority for known commitments which extend beyond the current forecast dates (2022/23-2025/26).

Performance over time commentary

Since Quarter 3 2022/23, the full allocation of renewals and Road User Charging schemes such as the re-let of contracts and the delivery of business operations systems in-house has been included. A paper was approved by the Programmes and Investment Committee in December 2022 for £170m and March 2023 for £77m to increase the Programme and Project Authority in line with the forecast and future known commitments.

Over the last two financial quarters, our underlying forecast cost has remained stable. However, since Quarter I 2023/24 the forecast has reduced owing to a reassessment of requirements surrounding road user charging schemes.

Environment performance over time (£m)



London-wide Ultra Low Emission Zone*

Programme update

On 29 August 2023, the ULEZ was expanded to cover all London boroughs. A report published on 31 October 2023 showed that vehicle compliance in outer London increased by 10 per cent, from 85 per cent when the Mayor announced the consultation for the proposed expansion in May 2022, to 95 per cent. In addition, the number of non-compliant vehicles seen driving in London on an average day has decreased by 77,000 compared to June 2023, which is a reduction of 45 per cent.

Since 30 January 2023, the largest vehicle scrappage and support scheme of its kind in the UK has been available to assist Londoners with adapting their non-compliant vehicles. Since launching, it has provided support for Londoners on lower incomes, disabled Londoners, charities, sole traders and businesses with 10 or fewer employees to replace or retrofit their older, polluting vehicles and make sustainable travel choices.

Successful scrappage applicants receive a grant to scrap or retrofit their vans and minibuses. Successful car and motorcycle scrappage applicants can opt to receive a smaller grant accompanied by up to two free annual bus and tram passes, which would give them a higher-value package.

On 4 August 2023, the Mayor announced changes to the scrappage scheme, extending support to all Londoners with a non-compliant vehicle. Grant payments were increased for scrapping a wheelchair-

accessible vehicle, van or minibus and it was also announced that businesses would be allowed to scrap up to three vehicles. The changes were successfully delivered on 21 August 2023 in advance of the ULEZ expansion on 29 August 2023. As well as these changes, a further £50m provided by the Mayor of London was announced for the scrappage scheme, making the total funds available £160m.

The announcement on 4 August also extended the ULEZ grace periods for sole traders, microbusinesses, small businesses and registered charities with non-compliant vehicles that have ordered new compliant ones which will not arrive in time.

In addition, to further help disabled Londoners, there are two new grace periods under the ULEZ scheme that will allow the use of non-compliant vehicles, which will apply until October 2027. One is for recipients of certain disability benefits (or their nominated driver). The other is for all wheelchair-accessible vehicles and some vehicles with other adaptations. People must register for these grace periods, and applications opened on 30 January.

The London-wide information campaign, launched in January 2023, has continued to raise awareness of the ULEZ expansion. This has continued past the launch date, encouraging Londoners to check their vehicle and emphasising the health benefits of the scheme. We are also working with stakeholders, including London boroughs and home counties, MPs and

London Assembly members, businesses, community groups and organisations representing disabled people, as well as a wide range of other Londoners to raise awareness of the ULEZ expansion and the scrappage scheme.

We have installed an extensive camera network to support the effective operation of the scheme. Installation initially focused on assets such as traffic signals and the TfL Road Network where we are the highway authority. Up until 2 October 2023, we had installed more than 2,000 new cameras with a total of more than 3,500 cameras enforcing road user charging schemes in London. We have also installed 2,579 signs, of which 940 are boundary signs.

Unfortunately, there have been incidences of vandalism on the ULEZ cameras and signs. All incidents are reported to the police and some arrests have been made. We are working closely with our contractors and the police. Where necessary, cameras are being repaired or replaced.

The London-wide ULEZ back-office system successfully went live on 29 August 2023 and is performing well. It is processing the anticipated increase in data volumes from the additional vehicles in the expanded zone, as well as the higher volume of associated transactions and enquiries.

*This includes other road user charging schemes

Environment

Direct Vision Standard phase two

Since March 2021, all heavy goods vehicles (HGVs) that are more than 12 tonnes are required to obtain a safety permit to operate in London as part of the London HGV Safety Permit scheme. This scheme is safety focused and contributes to the Mayor's Vision Zero strategy by improving HGV drivers' visibility, thereby reducing the risks HGVs present to vulnerable road users. It is run in partnership with the boroughs through London Councils. Vehicles that do not meet the minimum one star on the Direct Vision Standard rating, introduced in 2019, are required to fit additional 'safe system' measures to the vehicle. Since March 2021, the scheme has been enforced by a penalty charge notice.

From 29 October 2024, the minimum rating to operate without fitting additional safety measures raises to three stars, marking the beginning of phase two of the scheme. A consultation ran between 14 February and 3 April 2023 seeking views on the proposed Progressive Safe System, which enhances the current system to reflect technological development since it was originally designed. London Councils approved this and other scheme changes in June 2023, and operator guidance and specifications for the Progressive Safe System were published on 4 September 2023.

These changes will build on the safety improvements from the current scheme, including the following outcomes and benefits published in our One year on report (June 2022):

- The number of fatal collisions involving an HGV where visibility was cited as a contributory factor has halved from 12 in 2018, the year before the scheme was introduced to six in 2021. The number of serious injuries fell from 48 in 2017 to 17 in 2021
- The average daily compliance rates are very high, with more than 94 per cent of HGVs in London now operating with a Safety Permit and hauliers reporting that they are building Direct Vision Standard requirements into future purchasing decisions



We are reducing the risks posed by HGVs



We are helping London achieve its net-zero targets

Environment

Electric vehicle infrastructure

It is expected that London will need between 40,000 and 60,000 electric vehicle charging points by 2030, including up to 4,000 rapid chargers. Estimates show that a quarter of these could be accommodated by public sector land. 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.

The first tranche of our Electric vehicle infrastructure delivery programme will provide rapid and ultra-rapid charging points across 100 parking bays on our roads. Following the signing of the first contract with charge point operator Zest for an initial batch of 39 charging bays across 24 sites in early May, two further batches of 25 sites were released to the market in June. Tenders are being evaluated and it is expected that contracts for these two batches will be awarded in November.

We have completed a preliminary assessment of more than 2,400 sites across the GLA estate which has allowed us to accelerate the release of further batches to the market. In addition, we have reviewed current assessment criteria, to bring forward new sites across our land and wider GLA land.

As we will soon have contracts in place for all three tranche one batches, we are now agreeing scope for a second tranche of delivery. This will aim to identify a pipeline of sites to be delivered on both our own and GLA Group member land.

In addition to the roll out of rapid electric vehicle charging points, the Office of Zero Emission Vehicles has recently announced that London will receive almost £39m of capital funding through the DfT's Local Electric Vehicle Infrastructure fund. This will primarily be used to accelerate the delivery of low-powered charging infrastructure on borough highways, including for residents without access to off-street parking, and builds on the 400 fast-charging points that will be delivered by London boroughs by March 2024 using £9.7m of the Local Electric Vehicle Infrastructure pilot funding and additional borough delivery funded by the Government's On-street Residential Charge Point scheme.

Environment

Zero-emission bus fleet

Since celebrating the milestone in August of having more than 1,000 zero-emission buses – we now have more than 1,200 zero-emission buses in the fleet and are progressively adding more. We have a target to reach a total of 1,400 by the end of the financial year.

The milestone was marked by a Mayoral launch at Edgware Bus Garage, showcasing a wrapped electric bus, operated by the bus operator Metroline. We also celebrated the introduction of up to 100 new zero-emission buses in Sutton on routes 93, 154, 164, 213 and 80. This large addition to Sutton's fleet means that more than half of the journeys taken by bus in Sutton are now via zero-emission buses, thereby further improving local air quality.

Currently, more than 13 per cent of our bus fleet operates with zero-emission buses, including hydrogen, battery electric and 'opportunity charged' electric buses. This progress is key as it contributes to our wider ambition to transform TfL to become the strong, green heartbeat of London.

Work continues on the route 358 electric 'opportunity charging' trial, which is expected to go live in the coming months. Once completed, the trial will use pantograph charging infrastructure at either end of the bus route in Bromley, one of the longest routes in the bus network, alongside the introduction of 20 new single-deck electric buses with enhanced customer and safety features.

We are currently on track to transition to a fully zero-emission bus fleet by 2034 but, with additional Government funding, this target could be achieved by 2030.

Since 2016, the number of fully zero-emission bus routes has increased from five to 54, with a further 15 routes using a mixture of zero-emission and low-emission buses. The number of zero-emissions buses on London's roads has seen an increase of more than 3,000 per cent since 2016, growing from 30 to more than 1,000 buses.

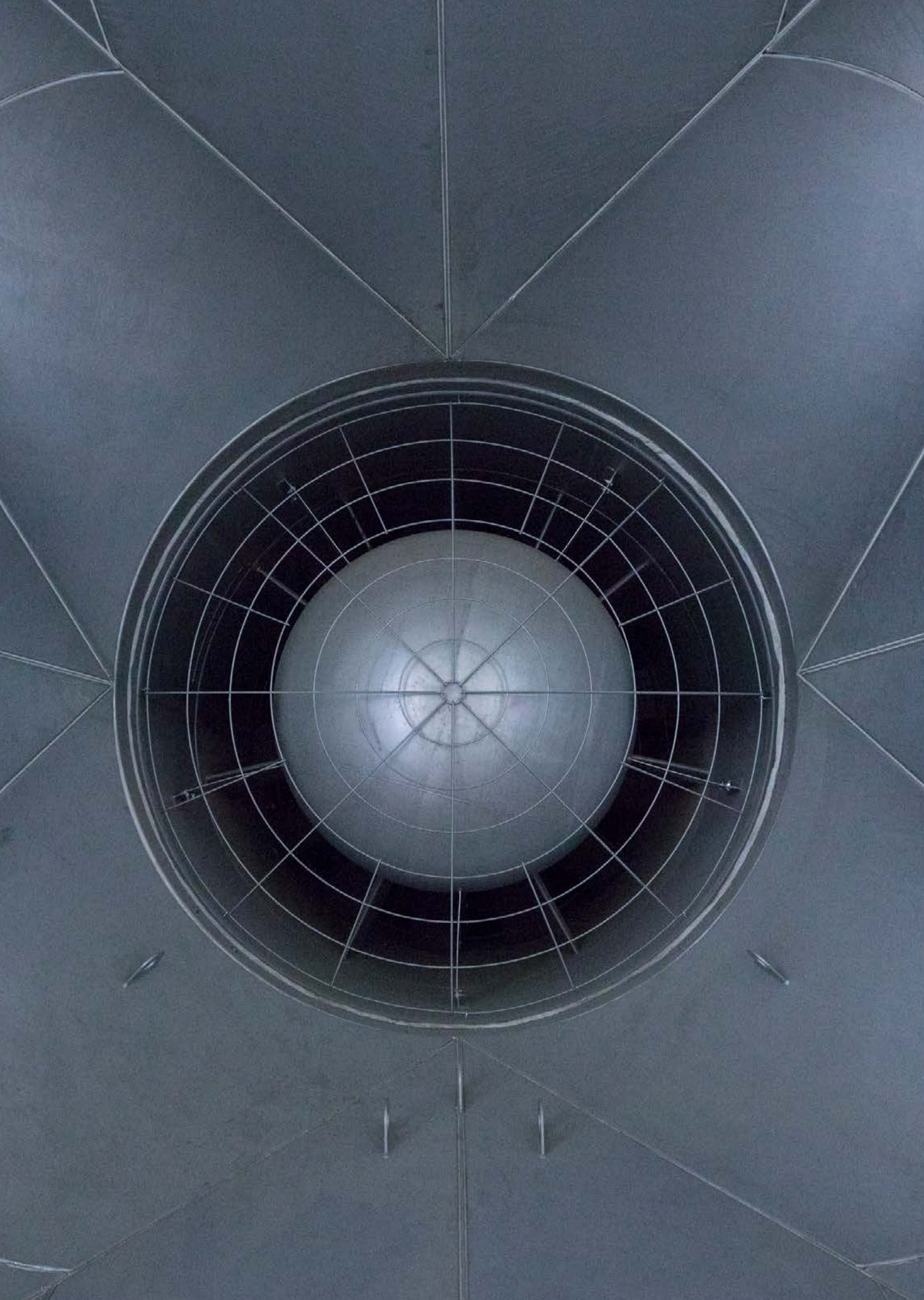
Zero-emission buses help Londoners breathe cleaner air and further contribute to the decarbonisation of the transport network, which is crucial to our work to meet the Mayor's mission for London to be a net zero carbon city by 2030. Through the decarbonisation of London's bus network, we will save an estimated 4.8m tonnes of carbon by 2034 or an estimated 5.5m tonnes of carbon by 2030 with Government funding.

Our zero-emission bus fleet is the largest in western Europe and has the lowest carbon dioxide emissions per passenger kilometres compared to other global cities such as New York, Sydney, Paris and Vancouver. All new buses joining the fleet will have enhanced customer features, such as improved flooring, seating, lighting and customer information, and will meet the industry-leading Bus Safety Standard.

In addition to this, the investment in zero-emission buses supports around 3,000 jobs across the UK, in locations such as Ballymena, Falkirk and Yorkshire. By creating capacity and certainty for a wider zero-emission bus market, this investment is paving the way for green national economic growth. Our funding pipeline for zero-emission buses also lowers costs for other local authorities by creating economies of scale.



Helping Londoners to breathe cleaner air



Environment

Waste heat

Waste heat from London Underground ventilation shafts is a constant and reliable source of energy. Much of it is simply released into London's air. This project will capture thermal energy of the ventilated air to feed to local users, powering heating and hot water in nearby buildings. Feasibility studies have been conducted for six ventilation shafts, to explore the scale of opportunity. This project could contribute to serving thousands of residential premises, plus commercial and public buildings such as schools. The proposed supply of waste heat would reduce a requirement for gas combustion and could therefore be associated with improved air quality through a decrease in carbon emissions.

Current activity is focused on accelerating the delivery of an initial ventilation shaft site, and to identify an appropriate energy supplier. Following their appointment and a need to progress contracts and design work at this first location, work will continue in parallel to identify future waste heat opportunities across our estate. Other sites may not be limited to ventilation shafts, as options for harnessing heat from alternative sources, including pumped water systems, are being explored across the London Underground network. We also continue to receive significant interest from the market at a variety of locations.

The market engagement relating to the initial site is currently being used to finalise the procurement strategy and compile a delivery schedule.

Environment

Solar private wire

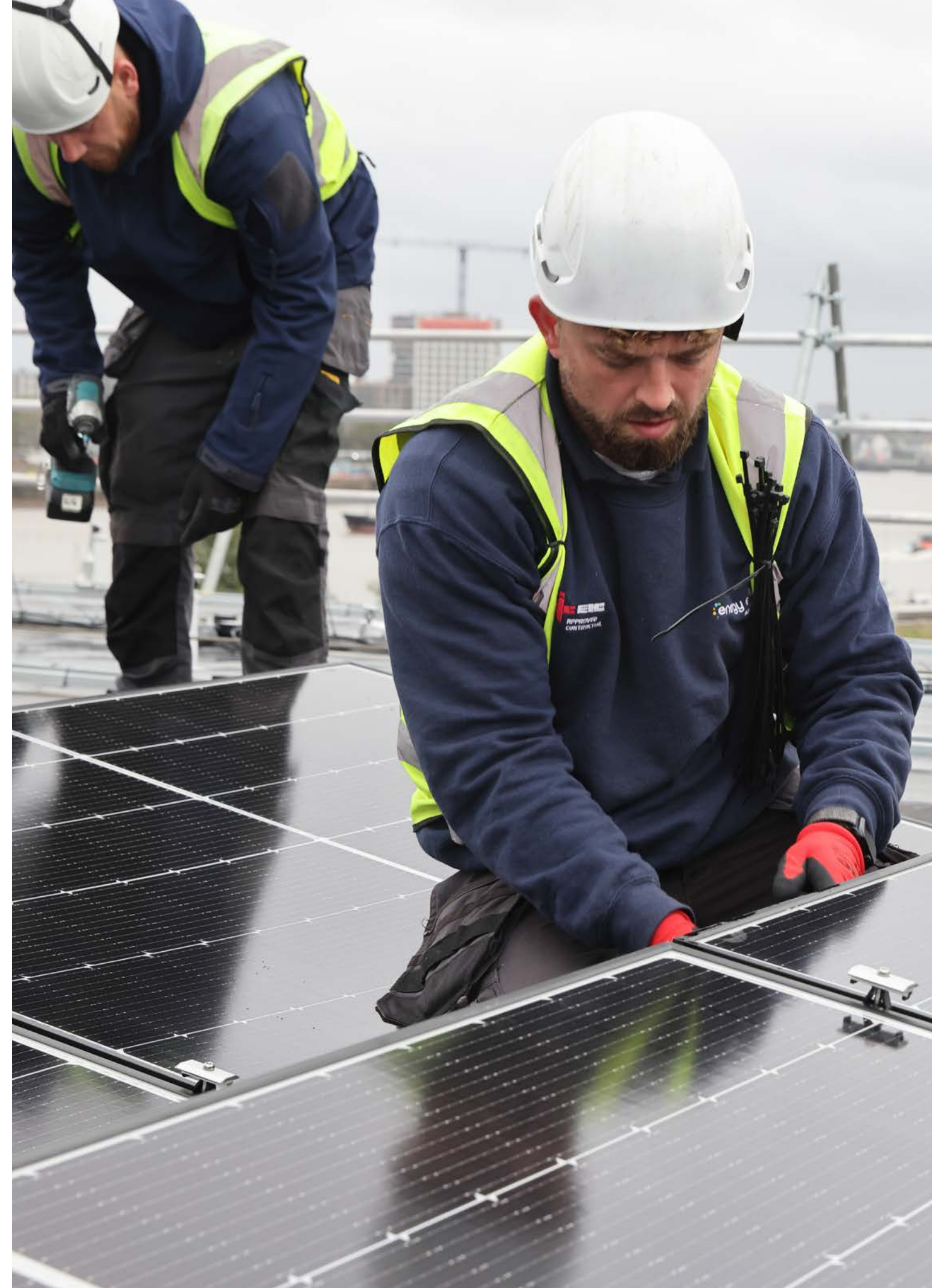
As London's single largest consumer of electricity, it is our responsibility to identify and utilise renewable energy sources.

The Solar private wire project presents an opportunity to directly receive zero-carbon (solar-generated) electricity from decentralised sources, bypassing the national grid and distribution network operators and associated charges. This has the twin benefits of guaranteeing renewable energy, while also offering financial savings.

Initial investigations suggest that our power network can accommodate 64 megawatts of renewable energy, equivalent to five per cent of the annual load.

The intention is for a solar collaborator to carry out detailed project identification and development. We would ultimately purchase the energy to assist with powering the London Underground network. Following an extensive market engagement exercise, a procurement strategy has been developed, with endorsement received at our Commercial Assurance Meeting on 12 September.

The project has also achieved the major milestone of identifying a single preferred option for our delivery model. This provides an opportunity to finalise tender documentation, with a focus now on accelerating efforts to secure a contract with a delivery partner.



We're investing in renewable energy sources



Environment

Building decarbonisation

We are one of London's largest landowners, with roughly 6,000 registered structures of a wide variety of building types in our estate that we own and operate. These include stations, depots, river piers, head offices and approximately 3,000 rental properties and housing developments. We are also the single largest energy consumer in London with a total aggregate electricity consumption of 1.6TWh across traction and non-traction power and bus demand per annum (equivalent to roughly 457,000 domestic consumers).

Some of this energy consumption in our buildings comes from burning natural gas, which results in emissions of air pollutants such as nitrogen oxide and particulate matter. Considering our contribution to London's emissions, we must take significant steps to address and reduce all sources of our emissions and accelerate a switch to ultra-low and zero-emission technologies.

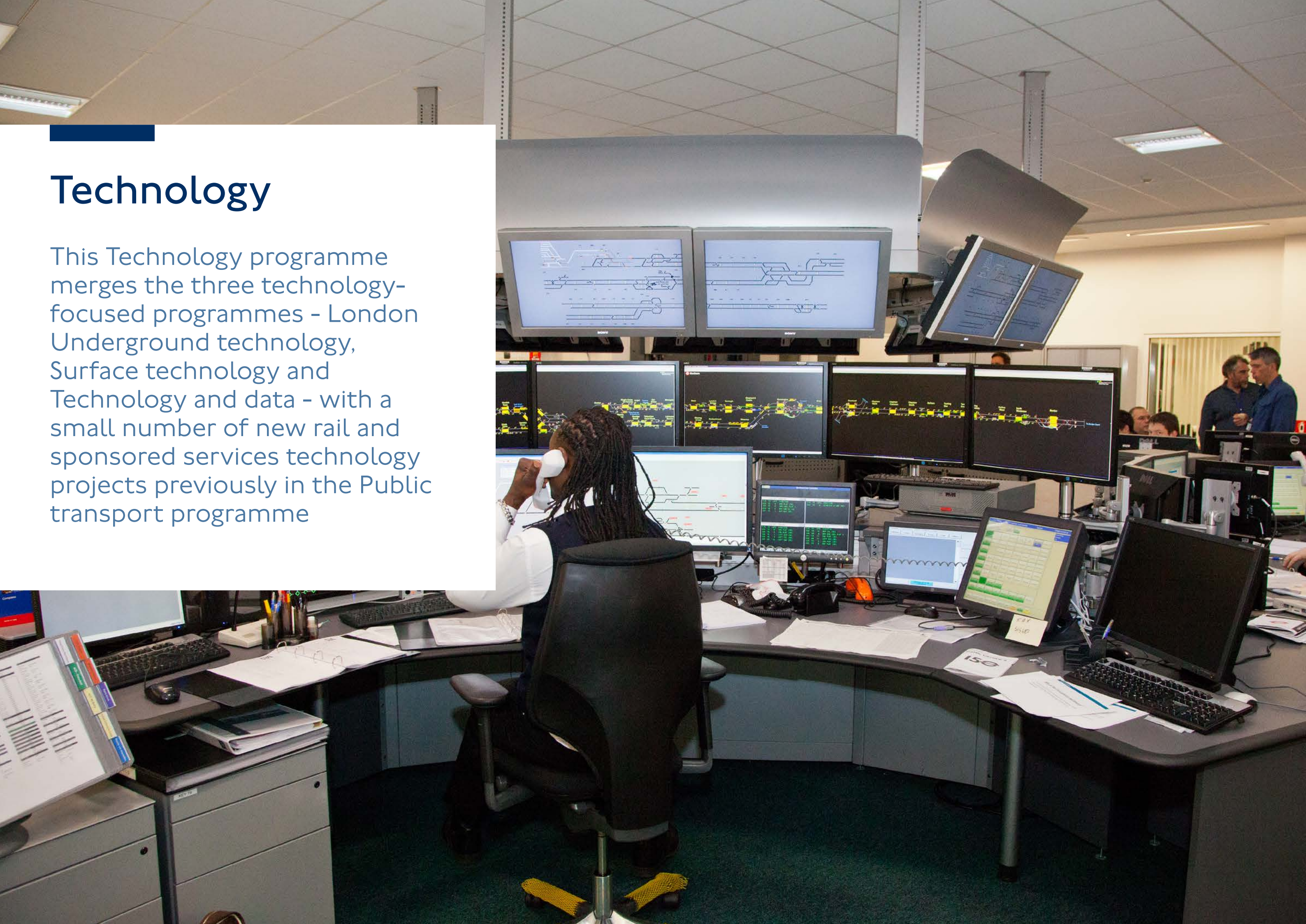
The strategic objective of the building decarbonisation programme is set out in our Corporate Environment Plan, published in 2021. This states our ambition to achieve net zero carbon across all operations, including head office buildings, by 2030.

Desktop modelling of decarbonisation initiatives was produced as part of a deep-dive report completed in 2022. This study focused on our buildings estate to create a carbon baseline for our entire property portfolio and assessed the potential costs, benefits and business case of a package of decarbonisation interventions rolled out at many sites across the network. Following the report, further studies were completed at eight priority sites that were considered to have an opportunity to achieve significant savings in carbon emissions.

Work is currently under way to develop plans at these eight sites and coordinate a delivery schedule that maximises value for money, while delivering on decarbonisation goals. A further tranche of feasibility studies that will cover 23 buildings across 14 sites was commissioned on 23 October, with the intention to create a rolling programme of interventions to reduce the carbon footprint of the estate in the coming years.

Technology

This Technology programme merges the three technology-focused programmes - London Underground technology, Surface technology and Technology and data - with a small number of new rail and sponsored services technology projects previously in the Public transport programme



Technology

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and Project Authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	265	636	901	1,082	181
Change since last Investment programme report					
No change	44	(51)	(7)	167	

Financial commentary

The increase in Programme and Project Authority since Quarter I reflects the July Programmes and Investment Committee submission which was where the Technology portfolio was presented as one for the first time. This sought authority for projects such as iBus, Deployable enforcement cameras, cycle hire re-let, Connect and London Underground's asset management information systems projects.

The £110m forecast versus authority is due to Programme and Project Authority for all existing commitments and future known commitments within the portfolio that are required.

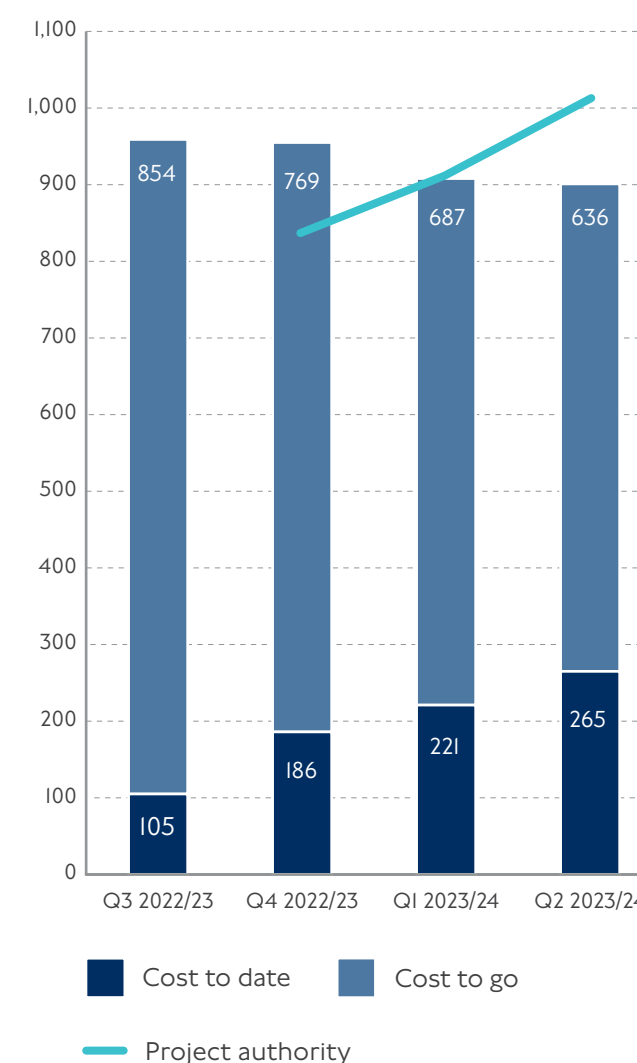
Performance over time commentary

The main spend in the last quarter was on payments projects, including Project Hina, Oval and the Performance Assurance Fund.

Since forming the portfolio in Quarter I 2023/24, the forecasts have continued to perform well with a one per cent change in the forecast since last quarter.

Key forecast movements reflect the revised schedule to the i-Bus2 programme to provide a more robust schedule of activities and contract award dates, this still fits in line with overall completion but will be reviewed once tender evaluation is complete. This, combined with reductions in cyber security, payments and other technology and data programmes, have been partly offset by acceleration of connectivity obsolescence, increases in Digital Workplace, Enterprise Resource Planning, Digital, Technology Services Operations and overprogramming.

Technology performance over time (£m)



Technology

Operations technology

Programme update

Compliance, enforcement and safety technology

Work continues on the roll out of deployable enforcement cameras on our road network, enabling us to target specific safety and non-compliance hotspots and make a significant contribution to meeting our Vision Zero goal. They are currently operational at 43 high-priority locations, selected on the basis of recent safety and compliance records. We are now closely monitoring changes in driver behaviour and road safety, with early indications suggesting that the cameras have already delivered 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 several cameras to be installed in 2023/24 and have started site-enablement work and installations. We are constantly reviewing our approach to ensure that site selection maximises safety and public transport benefits.

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

On average, we manage 10,000 cases of work-related violence and aggression every year. As part of delivering the work-related violence and aggression strategy, the operational employee safety programme has rolled out an additional 200 body-worn video cameras to employees at risk of work-related violence and aggression who work in areas where they have the most frequent contact with members of the public. Body-worn video cameras are part of essential equipment. Significant progress has been made to distribute 300 emergency communication devices by the end of 2023.

As part of the Station security technology improvement programme, we have started the design of critical incident management functionality for 40 stations. The delivery of this functionality in 2024 will enable us to manage these stations during a critical incident and other key events. We are rolling out safety improvements to our CCTV estate and we now can remotely view CCTV at a further seven stations. Finally, we are improving the routing of public help points, to make sure emergency calls are handled promptly by those best able to help. We aim to deliver improvements to 15 stations by December 2023, with further improvements planned in 2024.

Network and public transport management

We are leading the way in delivering innovative new road management systems that 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 and efficient management of the road network and incidents. These systems will reduce delay, improve journey times and encourage a modal shift to more sustainable modes of transport.

In February 2023, we completed all the code required for the final release of phase one of the common operating view incident management system, and we continue to receive positive feedback on the system from users. It's due to be finished in January 2024.

We will complete the development of the real-time optimiser system in 2023 and will begin migration to live operation of the system in Quarter 4 2023/24. This will optimise traffic signals and respond to multiple modes of traffic, improving network performance. Further enhancements to the system are planned for 2024.

The requirements for video analytics are nearing completion. This project aims to provide improved real-time modal count data for all modes, enabling us to make better decisions on road space allocation.

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 past few months have concluded the tender process for iBus2 with the Contract Award Recommendation being published in September. Our focus has been on evaluating supplier bids in order to choose a preferred supplier.

Procurement has progressed for the new Countdown 3 system. Recent changes to the strategy have meant that suppliers are able to respond with an option to replace the entire asset if this proves better value for money. The Invitation to Submit Initial Tender was released to market on 4 August after which an evaluation period will then begin, alongside business case development to appraise the best option ahead of contract award in March 2024.

The contract was signed with Via in November 2022 to deliver the replacement of the 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. Delivery began in March 2023. Works are progressing well, and delivery is anticipated to complete in late 2023.

Cycling and micromobility

The London e-scooter rental trial has been operating for more than two years, with 10 participating London boroughs making up a continuous trial area. In the period ending 22 October 2023, 75,000 trips were made with a total fleet size of 4,200 vehicles. This brings the total to 3.1 million trips for the trial to date.

In response to updated DfT guidance that allows e-scooter trials across the UK to be extended until 31 May 2024, we have awarded contracts to Dott, Lime, and Voi to operate the next phase of the London trial, after a competitive procurement process.

The trial extension will build on learnings from the current trial and provides operators with opportunities to test new onboard technologies, including pavement-riding detection, tandem-riding detection and acoustic vehicle alerts. This will ensure that London can continue to learn about e-scooters and the role that they can play in London's transport network.

In the 2022 Queen's speech, the Government proposed legislation to legalise e-scooters and grant powers to strategic authorities to manage rental operations for micromobility. The King's Speech in 2023 confirmed, however, that there would be no legislation on this in the next parliamentary session. Despite this, we continue to advocate for this legislation to enable us, working closely with London councils and boroughs, to apply the same approach we have taken with e-scooter rental to all micromobility rental services in London, specifying standards and how operations should work in London, including parking.

Preparation is under way to procure a new operating contract for the Santander Cycles scheme, as the existing contracts expire from 2025. A contract notice was issued on 14 July 2023, ahead of schedule.

More member hires have taken place so far in 2023 than at this point in any previous year, meaning we're on track to have a record year. In total, more than 4.1m annual member hires have taken place already this year, and these hires are a combination of legacy annual membership and the new annual membership introduced in September 2022. In addition, a total of 1,631 hires have been made at the new Clapham South hiring station since it opened in August 2023.

Connectivity

We have progressed towards awarding a contract for the delivery of our renewal of operating networks system, which will renew critical communications infrastructure on the London Underground prior to obsolescence. This work will ensure that critical information like signalling, CCTV and radio continues to be transmitted, facilitating continued operation of the London Underground network. As it rationalises multiple existing systems, it will be cheaper to operate and reduce our carbon footprint. We recently completed a detailed external assurance review of our proposed contract and intend to award the contract later this year.

Digital asset management

We are continuing works to consolidate our asset management systems into a single platform. This will enable us to better manage the performance of our key operational assets across London Underground and improve how we plan and deliver critical maintenance works.

We are now in the latter stages of delivery and are migrating the final packages of asset information onto the new system. We plan to complete transition of London Underground areas in February 2024.

We are also embarking on a programme of works to fully digitise our asset management capabilities across our estate, enabling us to continue to improve how we manage our assets, ensuring our data is fully accurate and up to date and allowing us to introduce next-generation tools to support our investment decision-making.

Tools for planning, automation and employees

This theme delivers the technology tools needed to support our planning, automation and colleagues. We are preparing to replace devices for employees, including iPhones, prior to obsolescence, as well as renewing the system used to manage access to the London Underground network during engineering hours. More than 4,000 people per night work on the network, and ensuring access is appropriately controlled and managed is critical to supporting their safety.

Technology

Technology and data

Programme update

Payments

KPMG undertakes an annual audit of our processes to allocate revenue between the train operating companies and us. This audit is an obligation under the pay as you go agreement to validate that revenue between the operators participating in London's pay as you go revenue collection facility is being apportioned correctly. Once again, in July, KPMG returned an unqualified audit, which confirms that our revenue allocation processes are accurate, and the controls are robust.

Digital workplace

During this quarter, we have finalised the requirements for our Future Desktop, the next suite of Desktops that will follow on from Windows 10, and issued a Request for Proposal for a technology partner to assist with the detailed design collateral for the Future Desktop.

We have completed a detailed gap analysis of our information governance policies and our ability to manage and govern those policies with our current technology and processes. The results of the gap analysis will highlight any areas that require focus, with an action plan and business case (if required) due to be completed in Quarter 3.

Further deployments of the 'enhanced audio' solution for our smart meeting rooms has continued. This is a targeted roll-out to larger meeting rooms which will benefit from superior microphones and speakers located in/on the ceiling.

Networks

Work to extend mobile coverage on the Tube has added four stations and eight tunnel sections this quarter, including the Oxford Circus to Tottenham Court Road tunnel and Euston station. The network now comprises 24 stations (19 per cent) and 20 tunnel sections (10 per cent) now live at the end of Quarter 2. Ahead of schedule, the first Elizabeth line stations will go live this year, with the public coverage completed by the end of spring 2024.

The Connect programme has replaced all 295 of London Underground's operational radio base stations, ensuring this operationally critical radio infrastructure is now supported into the 2030s.

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 4,319 of 4,606 (94 per cent) sites to the new network delivered by Capita. Of the 4,606 sites, 87 are currently operating on an interim 4G-based solution.

Technology services operations

The reseller framework is a key commercial framework managed by our Technology services operations and it provides a compliant and competitive route to market for commonly used IT products and services. The current contract is due to expire in September 2024 and we are working to retender and award a new reseller framework from then and provide a new IT Product Catalogue in 2025. Work continues on an internal IT service management solution, reviewing requirements for a long-term strategic solution. We expect to run an early market

engagement exercise this year. We are also taking on other projects to improve our processes and maintain our networks and data centres with support from our third parties such as Capita.

In our role as a central part of the GLA family, we are also continuing through 2023/24 with the strategic initiative for 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. We are about to start an important phase of the project where they will start using our service and devices. Technical migration activities are progressing well.

We also investigated a similar IT shared service initiative with the London Legacy Development Corporation. The findings from the feasibility study were presented to the GLA Group Collaboration Board in October. It was agreed that the work will continue to the next phase, noting a risk around resources.

Enterprise resource planning

We successfully implemented the new general ledger function to our SAP finance system on 14 July. This delivered improved financial management capabilities, including a divisional profit-and-loss and balance sheet to support the making cash count programme. This is a key element of the ERP programme and supports our finance strategy to grow our income and control our costs.

The replacement of the expiring SAP HR system continues with further development. We have had to defer the payroll module until 2025/26 as we must first replace the legacy SAP shift planner module, which rosters and schedules frontline colleagues. This will be achieved by the Operations Workforce Management project, which will provide accurate payroll data for rostered colleagues.

In turn, great progress has been made scoping and planning the implementation of the operations workforce management project. We contracted the software vendor UKG in early September and the project launch event organised for 100 colleagues took place on 3 October.

Contact centre operations

All five suppliers on the contact handling lot of the contact centre operations outsourcing framework provided competitive bids for the contactless payment card contact handling re-tender. A contract award recommendation has been made and was approved by the commercial board on 16 October. Internal resources have also been onboarded to help build resilience and internal knowledge of contact handling processes in this key area. The re-tender of the Street Faults reporting tool has concluded, with the incumbent supplier, MySociety, being awarded a further four-year contract to continue operating this service. The re-tender of the interactive voice response service is also under way; the current contract expires in June 2024.

We are defining the scope for the re-tender of our concessions services contract. We will be seeking separate suppliers for the contact handling and technology/fulfilment elements of the service.

Data analytics

We have almost concluded a series of data maturity assessments across the organisation, using the Government's model as a framework. Some common themes have emerged in terms of areas of strength and areas that we will need to prioritise when developing the data strategy delivery roadmap. We have established two working groups to help set our direction for data, our corresponding capabilities and our ways of working. We are meeting regularly with these groups to test design options and emerging priorities, and we are targeting the end of the calendar year for submission of a strategy draft.

Our Safety, health and environment data storage has entered the user acceptance testing phase after many months of development. This is the first time users have had hands-on experience with their new data platform and represents a significant milestone. Our Irregular Travel Analysis Platform, which tracks fare evasion and where it occurs more frequently, continues to be re-platformed to production following successful prototypes. This offers users greater confidence in the overall quality of the data and an improved, formal support wrapper.

Digital

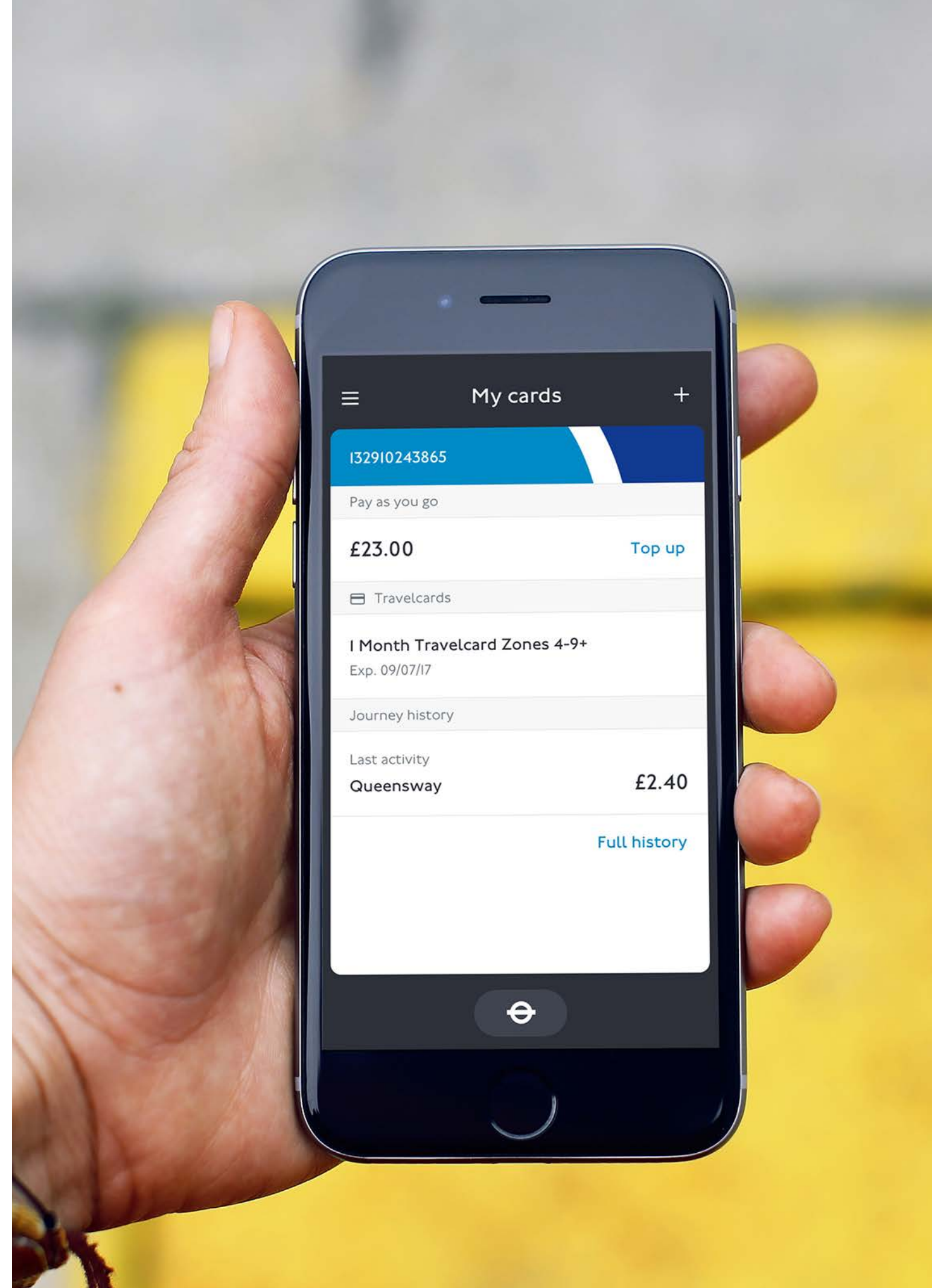
The TfL Go app has now been downloaded more than 4.7 million times and was used by more than 758,000 customers in August 2023. The app was a partner in the London Design Festival in September and featured content celebrating our rich design heritage.

We continue to release regular app updates, including detailed information about stops and interchanges on all bus routes, and more comprehensive information about the expected quieter times to travel. We have made good progress with developing push notifications both for line disruptions and network-wide disruptions, with a launch planned before the end of the financial year.

Our plans to augment our back-end delivery capability via the Crown Commercial Services framework are pending business plan approval of funds in December 2023. Once work can start, this will help accelerate delivery in line with business ambition.

Technology challenges

Global semi-conductor supply issues have distorted our delivery due to long lead times and pricing that increases at short notice. Though the worst of this is now behind us it has impacted our ability to procure and implement new IT infrastructure and increased project costs. We now have mitigations in place for our pipeline and live projects, however, we are still exposed to risk on ad hoc projects, small works or short-notice changes – including emergency works.



We are working to enhance the customer experience

Street, bus and rail-sponsored services renewals

This programme groups together renewals from the Surface assets and Public Transport programmes. These programmes share a common approach to work-bank management and through joining together associated activities such as bus-focused renewals, improved investment prioritisation and efficiencies can be applied



Street, bus and rail-sponsored services renewals

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and Project Authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2025/26	241	507	748	1,137	389
Change since last Investment programme report					
No change	31	(31)	No change	201	

Financial commentary

In May 2023, the Programmes and Investment Committee endorsed the creation of the Streets, bus, rail and sponsored services programme. This new portfolio includes renewal projects previously reported in the legacy Assets and Public Transport portfolio. This consolidation of projects will provide a single focus to maintain a good state of repair on the surface transport network.

The forecast does not reflect any material change since the last quarter.

Performance over time commentary

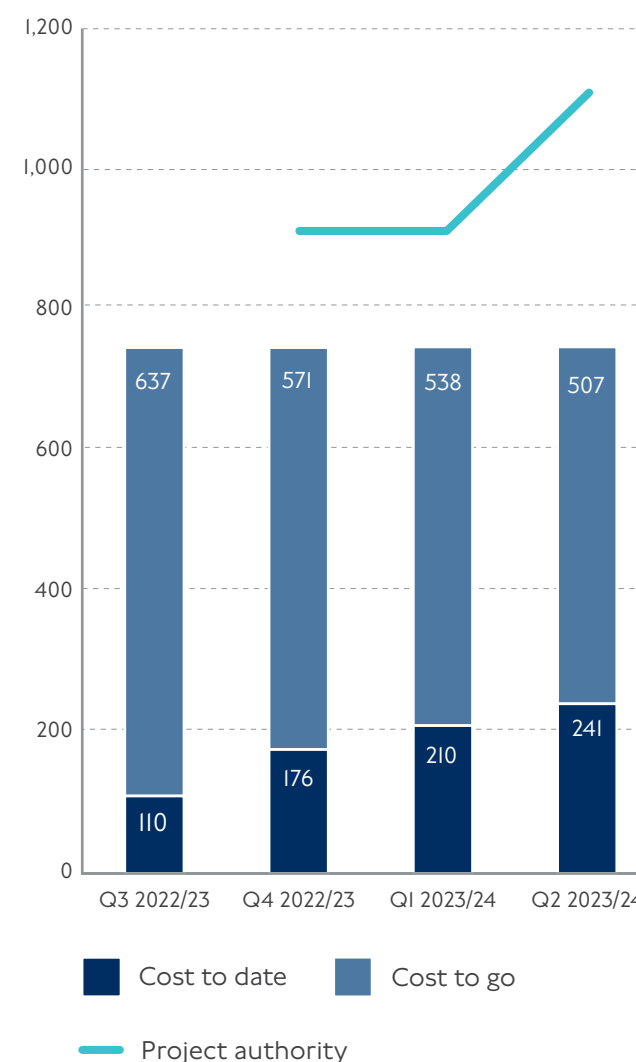
Over the last six financial quarters, our forecast cost has seen a generally decreasing trend, driven by funding challenges following the coronavirus pandemic. This has resulted in several projects being deferred. An increase in Programme and Project Authority to cover spend up to the end of 2025/26

was approved at the Programmes and Investment Committee meeting on 17 May 2023 and 19 July 2023.

Programme update

The programme brings together renewals that were split across our Surface assets and public transport programmes. These programmes share a common approach to workbank management and through joining together associated activities, such as bus-focused renewals, improved investment prioritisation and efficiencies can be applied. The Surface assets programme consists of a capital programme, surface operations assets, surface major assets and Local Implementation Plan Bridges and Roads. The remainder of the portfolio consists of renewals as bus, rail and sponsored services renewals, and supports investment needed to maintain the safety, performance and reliability of the DLR, London Trams, London Overground, cable car, cycle hire, new Routemaster buses and Woolwich Ferry.

Street, bus and rail-sponsored services performance over time (£m)



EFC reflects forecast starting 2022/23 vs authority which includes legacy Public Transport portfolio starting 2017/18

Renewals

Streets

Blackwall Tunnel southbound

This 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. We appointed Tarmac Kier JV as design and build contractor in April and have now begun the design and build stage of the project. Subject to budgets and value for money, we plan to start the works from May 2024.

Gallows Corner

The Gallows Corner flyover in Romford is one of our highest priority assets for renewal due to its age, condition and the current restrictions in place. Following the completion of 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.

The concept design using the existing foundations to support the new deck structure has been completed and signed off. A final version of the outline business case was submitted to the DfT in May 2023 for approval. We are now in the middle of tender period following which the design and build element will be awarded in January 2024 subject to DfT approval of the funding.

A40 Westway

Following successful completion of work package one, which consisted 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. The remaining scope has been prioritised and divided into further sub-packages based on asset risk to ensure it is affordable within current budget constraints.

Concept design work for the remaining elements has been completed and accepted. We have now awarded the first tranche of work package 2A, involving seven expansion joints, to the same contractor as the first work package. Detailed design has begun for phase one, with a plan for implementation in summer 2024. The design for the second phase will begin in January 2024 with a plan for implementation in early 2025. We will also be progressing with the design of work package 2B (three expansion joints) to establish the earliest opportunity to replace these remaining vital components. The progress of work package 2C (concrete repairs and other works) will start at a future date subject to budget availability.

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, we now expect that the full refurbishment of the Rotherhithe Tunnel will not take place until after the Silvertown Tunnel opens in 2025.

We are putting in place a series of short-term capital interventions to ensure the tunnel remains safe and operable until the main refurbishment project is progressed. We have completed the feasibility work for some of the short-term capital interventions, including the fire main and tunnel lighting, and are finalising the options to take forward for delivery in 2024.

Hammersmith Bridge

We released our third of the share of the costs for the stabilisation works, which meant the London Borough of Hammersmith and Fulham started works in 2022. The majority of stabilisation works are now complete and we expect completion of the remaining works by the end of 2023, ensuring the bridge is safe and can remain open to pedestrians and cyclists in the short-term. Alongside the DfT we continue to support the borough in developing a business case for the longer-term strengthening works to fully restore the bridge.

Carriageway renewal

Plans are currently in place to deliver 208,000 square metres of resurfacing against a target of 127,900 square metres. The overprogramming allows for any slippage on the programme but will also enable acceleration if required and should funding be made available. In the last quarter we have delivered schemes at A205 Dulwich Common (Lordship Lane to Freemans Alley), A312, the Parkway, A316, Chertsey Road (between London Road and St Margarets Road), A316, Chertsey Road (between Whitton Road and London Road). This contributes to an overall output of 77,835 square metres and a total of 15 schemes implemented so far. In the next quarter we plan to deliver significant schemes on A406 North Circular Road Westbound (Melville Gardens to Green Lane), A12 Colchester Road and A205 Upper Richmond Road (Carlton Drive to Kendal Place). We also continue to plan the remaining resurfacing schemes for the rest of the year.

Renewals

Bus

Kingston Cromwell Road bus station

The major redevelopment of Kingston Cromwell Road bus station will significantly improve the bus experience for our customers. The works will deliver a bus station that offers a better customer experience, is easier to navigate, and is greener and more energy efficient.

The new bus station includes the introduction of energy efficient lighting, energy efficient buildings with a low environmental impact, a new sustainable urban drainage system, new vegetation including a green bus station canopy edge, and the introduction of solar panels.

We have completed detailed design for the project and instructed the build, which started in August 2023. The works are planned to complete by summer 2024.

New Routemaster refurbishment

This programme is the mid-life refurbishment of 998 of our new Routemaster buses. During Quarter 1 2023/24, 51 new Routemaster buses were refurbished across four operators. This takes the total of completed refurbishments to 329 at the end of this quarter. The target for this financial year is to complete 616 refurbishments.



Our buses use state-of-the-art technology



We regularly test our vessels

Renewals

River services

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

We have completed our five-year maintenance cycle on both vessels, in line with our regulatory obligation. Both vessels have now received Lloyds Class approval, now that the licence for both vessels is due to end. Testing has been completed and the vessels are now available for operational use. South Layby Berth options continue to be reviewed with the opportunity to utilise existing assets instead of building new ones. Auto-mooring option studies have also begun with the review started on project requirements.

Telent have been selected to install our help points and live information schemes.

Work is ongoing on the Linkspan. Our contractor has undertaken surveys and is producing designs and has started renewing some of the critical elements.

Renewals

London Overground

Notable updates on the complex renewal schemes include:

- Renewal of the East London line signalling control system is undergoing a procurement strategy change to provide the opportunity to use Network Rail expertise in renewing this asset
- A total of 3,000 insulated track baseplates for the Thames Tunnel installation have been dispatched this period on time to deliver this vital safety-related renewal work over the 2023 Christmas period. The Main Works Contractor was awarded the contract on 30 October 2023
- The installation phase of Class 378 train cab simulator renewal is nearing completion. Delivery has progressed well, and the renewed asset was brought into use one month ahead of plan in October 2023



We have delivered renewals ahead of schedule

Renewals

DLR

Procurement activities for the renewal portfolio continue, with priority given to critical and safety-related projects. We are looking into combining workstreams to achieve efficiency where possible. This has meant early engagement with our contractors to understand where value can be achieved. Retaining key employees is a concern, with several engineers having left the business this quarter.

The replacement bogie frame project for the B92 train type is progressing well. Wheel slip protection trials have been completed. Software installation has begun for the plan to upgrade all 110 train units.

Long-line public address system installation is continuing at four stations. This system is used for station announcements, which are essential for evacuations as the majority of DLR stations are unstaffed.

Station controllers are an integral part of the DLR signalling system and the equipment is becoming obsolete. A replacement contract is due to be awarded by late November 2023, following a successful negotiation with Thales. This is the biggest signalling infrastructure renewal project the DLR will undertake in its lifetime over the next five years. The existing first-generation station controllers will be replaced with fourth generation controllers which will support the roll-out of the new DLR trains in 2024 and expansion of the DLR network.

High-voltage projects

High-voltage projects were impacted by the UK Power Networks sub-station fire at Poplar in March 2022. As a result, UKPN completion of power supply has been delayed until December 2023, requiring some key projects to be re-programmed so as not to impact services. The Poplar DC switchgear has been commissioned into service. Works have begun on shore supply at Beckton and Poplar depots which provides power in the workshops to move trains about the third rail traction system. Poplar depot power supply has been sectionalised and works have started on Royal Mint Street additional low-voltage supply to the substation.

Low-voltage renewals

Canary Wharf and Heron Quays low-voltage renewals works are going well. An opportunity has arisen to change the ceiling tiles at Canary Wharf which we have completed the scope for and is ready for tender. Low voltage distribution upgrade works continue with 50 per cent of the works completed. The remaining LED renewals work has been tendered and are being reviewed ready for appointment in February 2024.

Platform resurfacing

The second phase of platform resurfacing has started to make sure the following stations are compliant with slip-resistance standards: All Saints, Royal Albert and Prince Regent.

Track fixing

Track-fixing works continue, and we completed more than 1,000 baseplates in Quarter 2. Switch and crossings renewals are being planned for the Christmas shutdown at West India Quay. We are also installing the remaining six structural expansion joints at various locations around the transport network.

Lift upgrades

The lift system upgrade project has been completed on all 30 lifts and works have started on the next phase of 46 lifts. Cutty Sark escalators three and four are refurbished and have returned to service, while escalator two will return to service in December. South Quays escalators three and four will return to service following refurbishment this period. Works have started on lift renewals at Westferry and Stratford International.

Renewals

London Trams

Installation work for both the wayside and on-tram upgrades to communications equipment are now complete, and we have begun deployment of a correct-side door-enabling system on the Bombardier CR4000 trams, with completion currently forecast for January 2024. Our renewals programme continues across five asset groups: rolling stock, power, civils, systems and permanent way infrastructure.

Track renewals

The first phase of the Mitcham-to-Mitcham Junction ballasted track renewal was completed as planned during a 10-day part closure of the tramway from 4 to 13 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 was delivered during a planned 12-day closure from 8 to 20 February 2023.

The follow-up tamping and drainage works at Mitcham Junction and Wimbledon re-railing works were also completed during a 10-day closure from 4 August 2023. The nine-day part closure of the tramway began on 21 October as planned for drainage renewal works between Sandilands and Addiscombe tram stops.

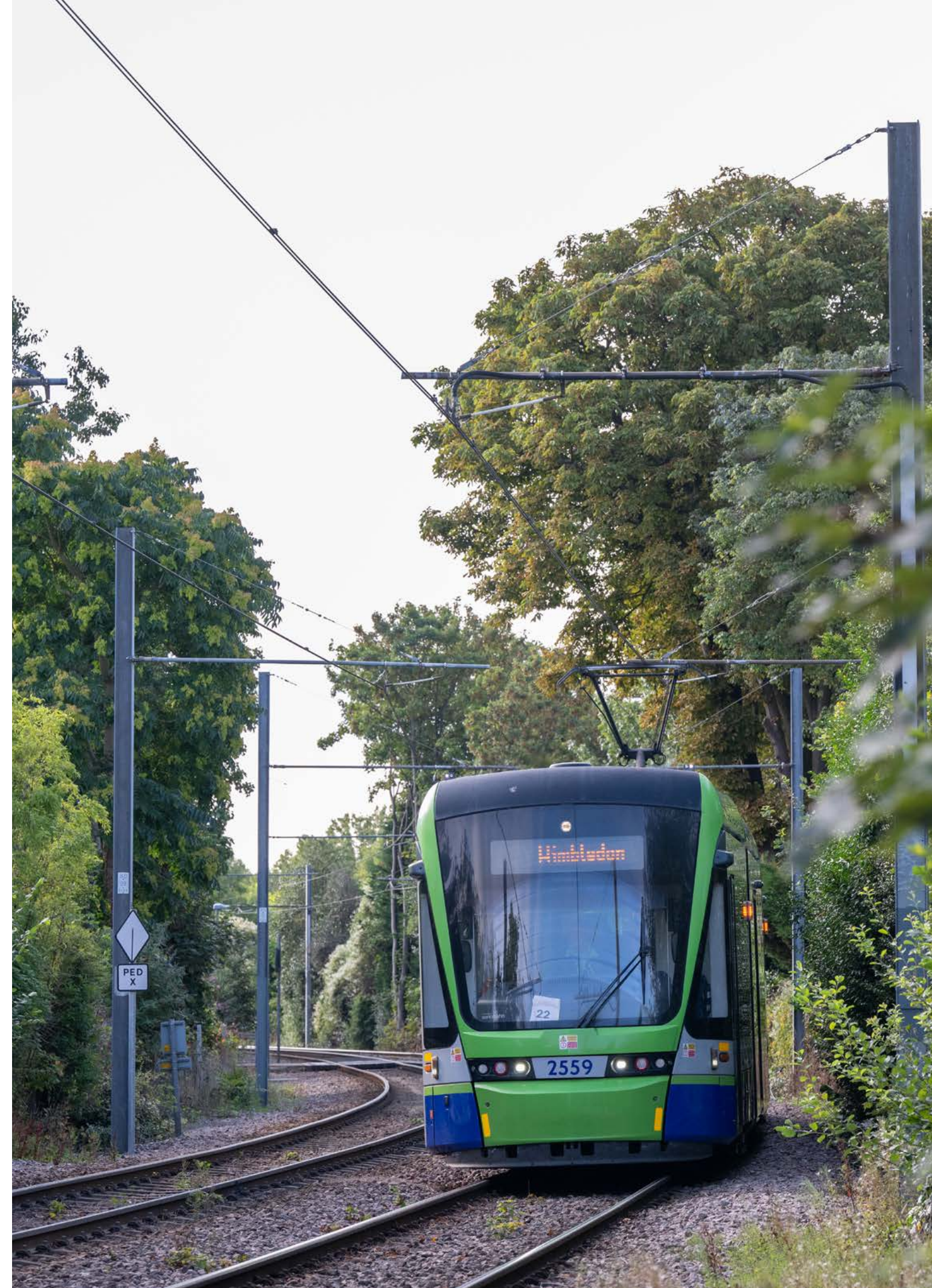
The Church Street track renewal was completed in April 2023 under the new embedded track renewals framework contract. The next package under this contract is the East Croydon and George Street truck renewal which is currently planned to be completed in two track closures, one in February 2024 and another one in April 2024. Shirley Hill road crossing renewal, which was initially planned for delivery in October 2023, has now been deferred to summer 2024 to allow time for additional design options to be considered.

Birkbeck tram stop

We completed site investigations to replace the retaining wall and step-free access ramp at Birkbeck tram stop, and identified that an updated design is needed. The design plans have been issued to the contractor for pricing and the works are planned to finish in Quarter 4 2023/24.

London Trams depot

In May 2022, we awarded a contract to start planned works to replace fire doors at the London Trams depot and ensure compliance with current fire safety standards. However, due to supplier delays, works restarted in October 2023 as planned to enable completion by February 2024.



We have upgraded our communications equipment

London Underground renewals

This programme delivers critical renewals across multiple asset groups that form an integrated transport system, including whole life asset interventions on our train systems and our wider infrastructure. The programme also includes the renewals for the Elizabeth line and our colleague welfare projects



London Underground renewals

Forecast period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and Project Authority (£m)	Variance: Forecast cost v. authority (£m)
2022/23 to 2027/28	503	2,972	3,475	3,158	317
Change since last Investment programme report					
No change	86	(233)	(147)	No change	

Financial commentary

Our Quarter I report excluded track forecast in the years 2025/26 to 2027/28. The adding of these missing years has increased the overall forecast cost by £468m. Previous quarters have been restated so commentary is able to focus on performance-related movements.

Quarter 2 continued the strong performance observed in Quarter I, including maintaining delivery of the Elizabeth line renewals programme, further embedding of an expanded colleague welfare programme, identification and embedding of 45 per cent of our annual efficiency target and roll out of metrics to further improve forecasting accuracy across the capital spend programme.

Key movements since the last report include a cost-to-date increase of £86m reflecting strong performance in the quarter by Fleet overhauls accounting for £26m and Track accounting for £26m with the balance delivered by rest of asset areas. Cost to go and forecast cost reduced £233m and £147m respectively primarily due to

reduction to heavy haulage forecast, and rephasing of fleet heavy overhauls beyond the reporting horizon.

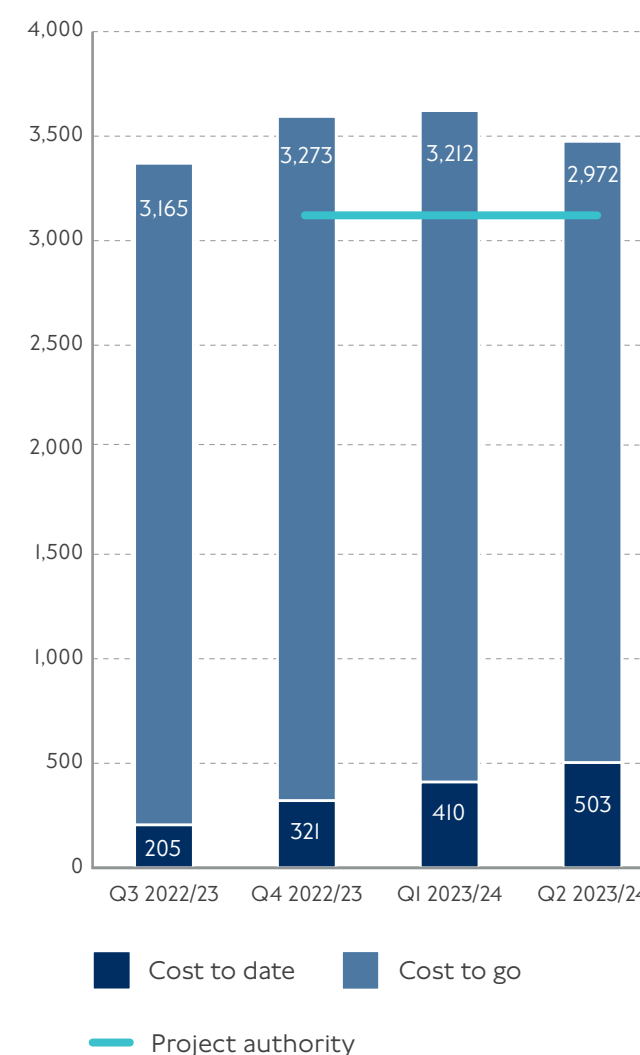
Performance over time commentary

Quarter 3 2022/23 – Quarter I 2023/24 has been restated to include track forecast in years 2025/26 to 2027/28.

2022/23 full year to Quarter 2 2023/24 London Underground renewals have delivered spend to date of £503m. Year to date, £9m of cost savings and efficiencies have been delivered.

The accelerated performance in the quarter was assisted by continued performance reviews across the asset areas to enable us to focus on key issues such as identifying cost savings, resourcing and supplier performance. Delivery confidence in achieving current year budgeted spend remains high, with planned increases in volumes of fleet overhauls and track. Furthermore, we are moving to the main delivery phases on projects such as the Central line improvement programme and incremental signalling renewal projects.

London Underground performance over time (£m)



Programme update

Key successes this quarter

The programme has had a successful quarter with strong progress towards our track renewal milestone delivered during track possessions. Highlights also include completion of the Victoria line fleet door overhauls, live testing of the first train on the Central line improvement programme and reaching 70 per cent LED lighting conversion on the Bakerloo line fleet. In addition, the programme completed safety testing on the mechanised renewal vehicle, and it was used in live track works for the first time at Wood Green. London Underground renewals remains on track for a strong performance against budget across the whole year, with a clear asset condition workbank in place should additional funding become available.

Network wide track renewals

Our track assets are an essential component of a safe and reliable railway. Track is continually degrading and needs rolling maintenance and renewals to maintain performance. Each section of track may have a residual life of 40 to 60 years, meaning we must renew two to three per cent of our track every year, as well as targeted component replacements. Where possible, we also aim to progressively install high-integrity, low maintenance, flat-bottomed rail on concrete sleepers, replacing bullhead rail on timber sleepers, some of which has been in service since the early 1900s.

This modern track is more stable and reliable. Between July and September 2023, we converted 1,451 metres of bullhead rail with the more modern flat-bottom form. In addition, we completed 408 metres of deep Tube renewal reconditioning works, thereby improving reliability and reducing noise.

Weekend possessions this quarter delivered the following:

- The renewal and plain line of points, re-railing one and removing two roads between Oakwood and Cockfosters on the Piccadilly line
- 300 metres of ballasted track renewal through Hammersmith platform 3, Piccadilly line
- Installing posts and 200 metres of fencing and access staircases along embankments at Northfields sidings
- 180 metres of ballasted track renewal running between Gloucester Road and South Kensington on the Circle and District lines

Track renewals is currently on target to deliver 3,500km of renewal.

Victoria line (fleet overhaul and depot control system renewals)

Phase one of the door overhauls is now complete on all 47 trains. The pressurised ventilation system upgrade and coupler overhaul have also been completed across the fleet. Trailer wheelset overhaul has been completed on 26 of the 47 trains, air filter overhaul on 21 trains and battery cells on 31 trains.



We've made strong progress on track renewals

The Northumberland Park depot control system project has been paused to allow a strategic depot control strategy to be implemented, based on the good practice developed for Piccadilly line upgrade. The project documentation for the depot control system has been completed (for this stage), ready for the project to re-start. Opportunity works within the depot are being reviewed to look at the point lock and detection equipment replacement.

Metropolitan line (fleet overhaul)

Bogies overhauls continue to plan with works on 44 of 60 trains completed. We are on-track to complete all the bogie overhauls of the Metropolitan line fleet in Quarter 2 2024/25. Negotiations with door supplier have been completed, governance arrangements put in place and components ordered.

Metropolitan line (Liverpool Street escalators)

Electrical enabling works were completed prior to the start of works on site. Hoardings have been erected for escalator works and site setup is now completed. Removal of the escalators and civils works started on 10 September 2023.

District line (fleet overhaul)

Preparations continue to start the overhaul of the S7 fleet (Circle, District and Hammersmith & City lines) in Quarter 2 2024/25 immediately after the Metropolitan train (S8 fleet) overhauls.

Jubilee line (fleet overhaul and component renewal)

Programme lift completed on three trains, taking the total to 13. Increased materials usage rate has impacted ability to ramp up to four trains per period which is now forecast to be achieved in February 2024 and revised completion in Quarter 3 2025. Trials on alternative supplier parts to address material bottlenecks have been successfully completed.

Tender evaluations on the underframe modification project have completed with best and final offer requests issued to bidders. Early investigations on door interlocking controls and drivers' CCTV systems have also concluded to address obsolescence issues and Office of Rail and Road concerns.

Jubilee line (station communication and ventilation systems)

Station communication systems renewals are progressing to plan with works on site at West Ham and Canary Wharf completed in the last quarter. We are now progressing with the handover into maintenance. Installation works continue to plan at the remaining four sites on the Jubilee line extension. Communications installation work at all sites is scheduled for completion in March 2024. We are progressing with works to upgrade the obsolete tunnel ventilation

control panels and refurbish the fans of the staircase pressurisation system at Jubilee line extension stations (Southwark to Canning Town) and intermediate shafts. Replacement of the ventilation management system is progressing to programme with 90 per cent of sensor works completed. The replacement of the local control panel of the tunnel ventilation system has now begun. The replacement of the pressurisation systems is also progressing to programme. The overall ventilation programme is scheduled to finish in September 2026.

Jubilee line (escalators)

This rolling programme of escalator refurbishments has delivered one further refurbishment in Quarter 2 at Stratford station in line with the programme. Works are continuing on the next three refurbishments at the Waterloo, Bank and London Bridge stations to complete in Quarters 3 and 4 2023/24.

Jubilee and Northern lines (incremental signalling upgrade)

The design stage of replacement of central computers for the Northern line is progressing well, with key enabling works and the concept design now completed. Installation works started in October 2023 for the first pair of computers (data transmission and temporary fibre racks). The concept design for the project to replace the train operator displays on both lines is under way, with an estimated completion date of February 2024.

Northern line (Kentish Town escalators)

Works have continued to schedule for the replacement of both escalators and station improvement works under a station closure. This closure is running for 12 months to June 2024. We have completed removal of the escalators and civils works are in progress. Ticket office and ticket hall strip out is complete.

Piccadilly line (fleet overhaul and signalling renewals)

Programme lifts, door overhauls and wheel overhauls all continue to plan. Lift-cycle two is due to finish in December 2023.

Piccadilly line (Holloway Road lifts)

The construction of the new lift car has begun and factory acceptance testing of the new controller was successful. However, due to delays in approving the mechanical and controller designs there has been a slippage in bringing lift one into use from December 2023 to January 2024.

Central line (fleet and signalling renewals and incremental signalling)

An annual Independent Investment Programme Advisory Group review was conducted on the Central line improvement programme with no critical issues. It identified strong management team and a steady recruitment profile at Acton Works. The live testing on the first Central line refurbished train is almost complete and the train returned to the depot for snagging works in October 2023. Operational readiness reviews have also stepped up this quarter to prepare for employee training and customer service. Overhaul of motors is back up to the rate of 20 per week following the delivery of key components.



We've increased station capacity at Marylebone

Feasibility and planning for the first tranche of the incremental upgrade to the signalling interlocking computers on the east end of the line continues. We are still on plan to enter the early contractor involvement phase which will complete in October 2024 and then award full contract in the last quarter of 2025.

As part of our Ending violence against women and girls programme, we are upgrading the Central line station CCTV systems. Surveys taken with our Security team suggest building a viewing room at the Hainault and Ruislip depots.

Bakerloo line (fleet overhaul, LED lighting conversion and signalling upgrade)

A total of 12 programme lifts, four heavy overhauls and five mini-overhauls have been completed. Approximately 70 per cent of the Bakerloo line fleet is now fitted with LED lighting, equivalent to reducing 120 tonne CO² carbon emissions annually. Work is on target to achieve 75 per cent conversion by November 2023 and completion by March 2024.

The procurement of signalling equipment and design works is continuing 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 lineside rooms on the Bakerloo line. Ten out of 16 sites have been completed, with Lambeth North recently completed as planned.

Bakerloo line (Marylebone escalators)

The work was finished on the final escalator replacement and it was brought back into service in late September 2023. The completion of the wider station gateline and an additional escalator will provide increased station capacity to support future customer demand. The gateline works are still planned to finish in December 2023.

Bakerloo, Central and Waterloo & City lines (accessibility)

Bakerloo line has fitted wheelchair bays on the sixth train and we have started engaging with Government's Disabled Persons Transport Advisory Committee and our own Independent Disability Advisory Group ahead of our application to extend its existing rail vehicle accessibility regulations exemptions. Our Independent Disability Advisory Group has also been consulted on Central line accessibility works in August 2023 and they provided positive feedback. This was followed by a DfT visit to Acton Works in September 2023.

Rail adhesion trains

Overhaul of the second Central line rail adhesion train is continuing to plan and is nearing completion. Preparations in parallel to begin overhaul of District line rail adhesion train on the completion of Central line.

Mechanised track renewal vehicle

Safety trials of the mechanised renewal vehicle are now complete, and it was used to complete works at Wood Green siding in September 2023. The work included installation of a new train arrester with associated sleeper replacement. The vehicle performed well, significantly reducing the manual handling required for the works and avoiding the need to transport materials through the station. We will continue to roll out the use of this new vehicle for planned track renewal and will carry out a formal benefit assessment in due course once work teams have become fully accustomed to operating it and it has been used enough to enable comparisons.

Modular points and crossings

Following open section approval in July 2023, work to complete safety assurance approval for use of the Kirow cranes in sub-surface environments is now under way. Remaining open and tunnel sections tandem lift approvals are due to be delivered in July 2024.

Remote track monitoring

The project is delivering new equipment which will be installed on two wagons to enable track condition recording, which will replace the existing track recording vehicle once commissioned. A feasibility study to assist the detailed design production has been commissioned and is expected to finish in April 2024. These two new vehicles will increase service reliability and provide critical data to keep the network safe.

Engineering vehicle overhauls

Engineering teams are still working on the battery locomotive bogie frame repair process after successfully completing trials. This will be integrated into the overhaul programme of traction and other works. Preparation for procurement of bespoke parts required to overhaul our spoil and ballast wagons, used to carry materials to and from work sites, is ongoing. A contract for overhaul work on our second Matisa tamper has been awarded, and work is due to start in February 2024. A strategy for in-house overhaul of the Plasser tampers is being developed.

Network-wide water ingress remediation

Contract award for delivery of the selected option at Mayor Sworder's Arches sub-station in London Bridge is still scheduled for February 2024. Options were agreed in October 2023 for remedial works at St Paul's and Chancery Lane stations and mobilisation has started for concept design. Concept designs at Liverpool Street and Charing Cross were finalised in August 2023.

Network-wide cutting and embankments

Works continue to stabilise the cutting between Grange Hill and Chigwell stations on the Central line to ensure the continued safe running of the railway. Currently, the strengthening works at the N31 footbridge have started and are due to finish in late 2023. In other areas of the site, final regrading and reprofiling continues. The full project completion is due in March 2024.

Concept design for the enabling works has been completed for the Canons Park to Queensbury embankment stabilisation project; it has now been agreed that

detailed design for it will be undertaken by the main contractor. The project is now starting the tender process for the enabling works and main works, and we are planning to be in contract in early 2024 and targeting to start construction works in early 2025.

Feasibility work continues on further embankment/cutting stabilisation projects (Finchley Central to Mill Hill East, Triangle Sidings, Northolt to South Ruislip) with a continued focus on efficiency of delivery. Tender evaluation has been completed for the ground investigation works between Northolt to South Ruislip stations to support option development.

Plaistow station and power sub-station

The roof works are complete. The colleague welfare improvements are due to be completed in mid-November 2023, with final snagging works for the site to be completed following this. We have undertaken an assessment of a leak in the station roof and are exploring the possibilities to remediate this.

Station platform remediation works

Remedial works at ten quick-win low-complexity sites requiring no design will start in January 2024 and are scheduled to be completed in March 2025. Design of the remaining selected remediation options began in July 2023, and site works are scheduled for June 2026.

Platform tactile replacement works at Osterley station were completed in April 2023. Platform remedial works at Plaistow station began on site in September 2023.

Welfare facility renewals

There is a notable difference in the provision and access to colleague welfare throughout our organisation, with several locations falling under acceptable standards. Consequently, this project aims to enhance our welfare facilities. We are obligated by the Workplace Regulations 1992 to ensure high-quality welfare for our colleagues, as well as bound by the Equality Act 2010 to prevent workplace discrimination. Colleague welfare facility improvements include mess rooms, kitchens, locker rooms, changing rooms and shower and toilet facilities.

We are working to improve the condition of welfare facilities and environment for our colleagues across London Underground. Five sites have been completed and site works are continuing at a further four locations. Work at three more locations started in October 2023. We aim to complete eight sites by the end of March 2024. Due to unexpected site conditions identified during an intrusive survey, such as the discovery of hazardous materials, progress was slower than expected in 2022/23. However, these lessons have been applied to the new tranches of work and more thorough investigative surveys are planned for future sites.

Smoke and heat exhaust ventilation systems

We are replacing and refurbishing the life-expired components that form part of the smoke and heat exhaust ventilation systems located in the roofs of Bermondsey station and Stratford Market depot. The designs of Bermondsey new actuators have now been completed. The refurbishment of both systems is scheduled for completion in October 2024.

Secondary lifts (supporting step-free access)

On-site works at one of the Green Park lifts has been delayed due to a clash with other planned works and is now planned to start on site in January 2024. One of the lifts at Bermondsey is on plan to start on site on 3 December 2023 and another at Hounslow East started with relative place of safety works and the main lift works are due to start in November 2023.

Due to funding constraints, we have not been able to start manufacture of the next three lifts in the programme which will impact delivery of the 2024/25 workbank.

Uninterruptable power supply

We awarded a new contract in December 2022 to continue the replacement of 31 life expired uninterruptable power supply units to ensure a continuous power supply to critical signalling assets on the railway. The works are on plan, with detailed design complete and site works began in September 2023 for the first batch being installed on the Victoria line. The first of these at Walthamstow has been commissioned to start a rolling programme.

Offline battery power inverters

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

During Quarter 2, we successfully commissioned the last of the 20 units planned in tranche one of the replacement programme. The procurement for a second tranche of 40 was awarded in October 2023. This contract includes product development changes and recycling of key components which will help mitigate the obsolescence risk of the remaining units. Internal scoping and market engagement is in progress for further units as part of the strategy work on the longer-term solution.

Traction power

Design work is in progress for the replacement of traction isolation switches located in sidings on Central and Bakerloo lines, continuing the programme to address equipment non-compliances and removal of operational restrictions. The works are planned to begin in 2024/25.

The construction of a new room to house a replacement switchboard at Holborn was completed to plan in April 2023. These complex works are being implemented under special access arrangements which have progressed well. New equipment was delivered to site under this arrangement and has been installed in Quarter 2, ready for site testing and start of commissioning in December 2023.

LED lighting

Good progress has been made across the delivery programme with works nearing completion at Hainault depot, in progress at Ruislip depot, and designs being developed for the continuation at Stonebridge Park. The conversion of lighting at Oxford Circus started in April 2023 and is ahead of planned completion by February 2024. We have also completed scoping

surveys at King's Cross St Pancras station in readiness for a contract award in Quarter 3 2023/24, with delivery to start on site in early 2024. Conversion of lighting at smaller stations is being delivered internally, with a team mobilised to deliver 22 priority stations during 2023/24. In Quarter 1 we delivered 5.5 stations. This quarter, we delivered at the same rate of 5.5 stations.

East Ham wall rebuild

Negotiations continue with property holders regarding access to the wall though local gardens. This is required as the railway is adjacent on the opposite side with cables and other services occupying the safe area next to the track. The access agreements are to enable us to carry out the required temporary works, including propping, ahead of a permanent solution being installed.

Optioneering proposals for the permanent solution have matured, and they include challenges such as the location of welfare facilities within a very constrained site. There is a strong focus on reviewing and mitigating the key risks regarding our assets, the public and residents.

The project is planning for approval of the procurement strategy in November 2023. Once the procurement strategy is approved the project team will engage with a delivery partner to jointly mature the base designs and undertake critical activities ahead of the main works. Initial priority is to replace the current temporary heras fencing, which has been on the site for the past three years since the walls collapsed. A secure boundary fence around the site runs between the properties and the running rail to form a secure perimeter for the worksite. This will require complex temporary works

and is currently forecast for completion by September 2024, while supporting the rebuild of the main wall. It is forecast to start the complex enabling works ahead of the new wall construction by December 2024. A forecast completion date of the new modular replacement wall and other remedial works is June 2026.

Elizabeth line renewals

During Quarter 2, the Elizabeth line asset renewal programme has continued to progress and is on track in terms of actual and forecast spend. The workbank is developing and new projects are being added with change control in progress. Key possessions for delivery in 2023/24 were completed in October 2023, and others remain planned for November 2023 and February 2024, with a dedicated team coordinating interfaces with Network Rail.

In Quarter 2, contracts were awarded for condition surveys at Great Eastern stations to inform design and required works, such as on Ilford station handrail, which are planned to be delivered in the Network Rail February 2024 possession. Enabling works using the Flashbutt welder have begun for the Connaught Tunnel re-railing with our Track Delivery team fully mobilised to support the re-railing. The eastbound re-railing was completed in October, and the westbound is planned to complete in November. In October, Eleanor Street lighting works and voltage transformer renewals at six locations were completed, including Westbourne Park and Pudding Mill Lane. Custom House points work and Chevron lighting to improve safety are both on schedule to complete in the November possession.

Railway systems enhancements

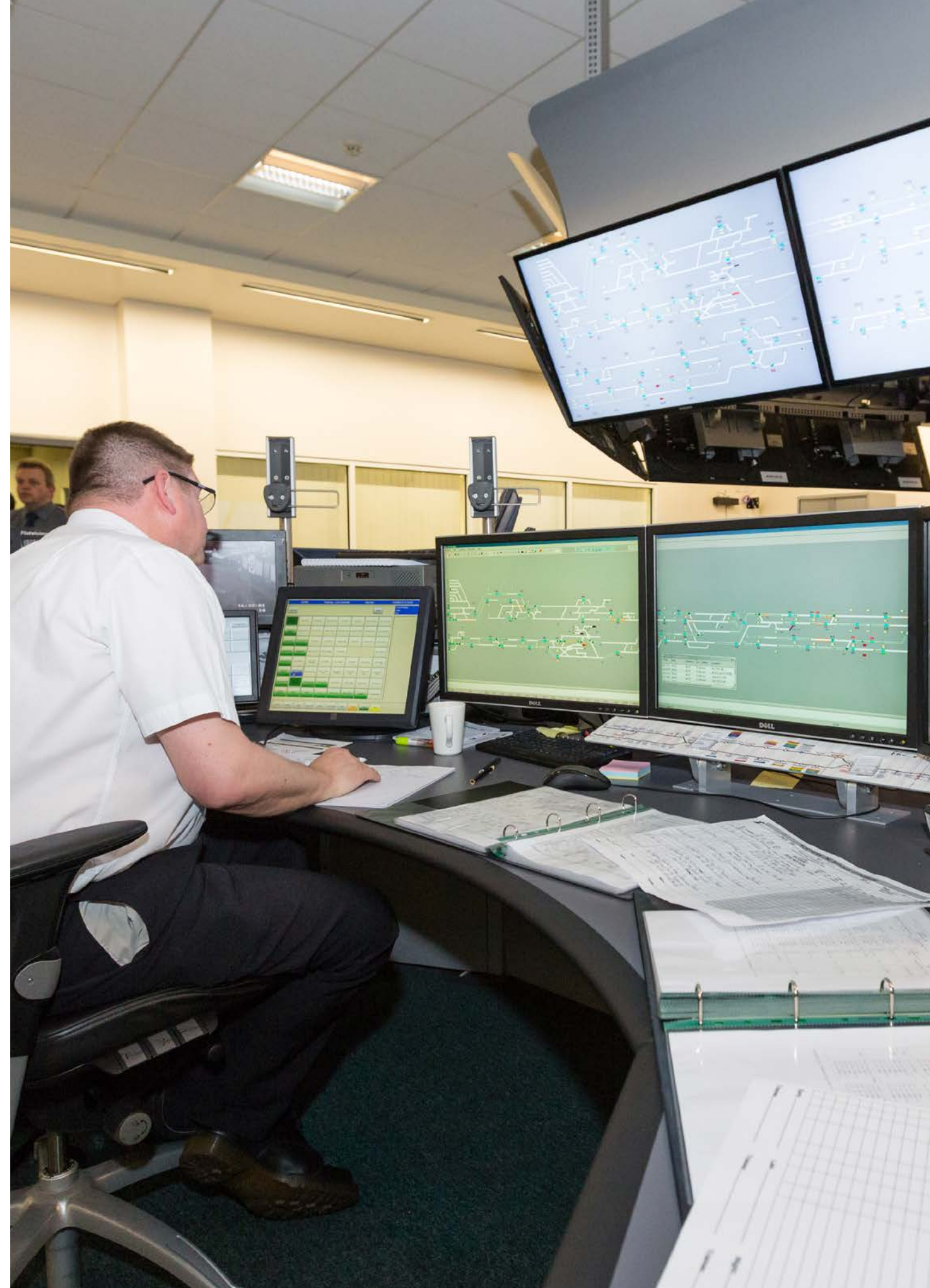
Delivery of the scheduled Northern line signalling software updates continues, with the first release commissioned on the railway at the end of October 2023. This was delayed from July 2023 due to the need to correct two safety concerns with the user controls at Highgate Service Control Centre and the train operator displays. The patch to address these issues is now complete and ready for roll out.

The final Northern line signalling software release is scheduled for Quarter 2 2024/25, which has been rephased to accommodate other projects that are dependent on the same supplier key resources. These priorities include the Four Lines Modernisation and DLR rolling stock replacement programmes. The Northern line 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 in Quarter 3 2022/23, and the final release is currently scheduled for Quarter 1 2025/26. This is heavily dependent on the Four Lines Modernisation programme and when SMA8, which touches the Jubilee line within the programme, is delivered (currently scheduled for Quarter 2 2024/25).

The first phase of the second stage of enhancement work for the Northern line power supply has now been let to a contractor, which 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 were successfully completed with full fleet roll out achieved in Quarter 2 2023/24. These support Metropolitan line service uplifts being delivered as part of the Four Lines Modernisation programme.



We continue to update our signalling software

Appendix

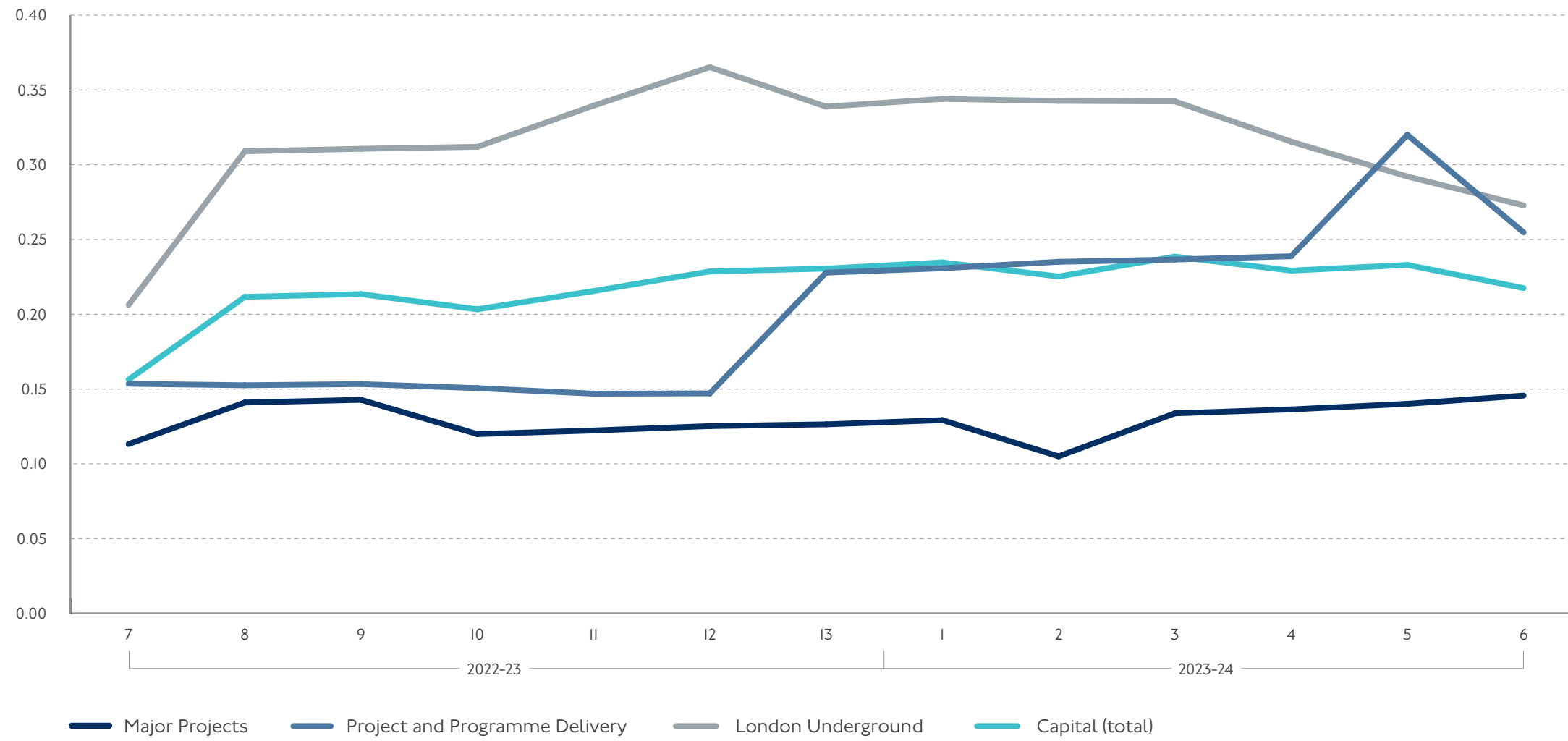
Our safety performance data

We track the number of injuries among our workforce to show our progress towards our safety ambitions

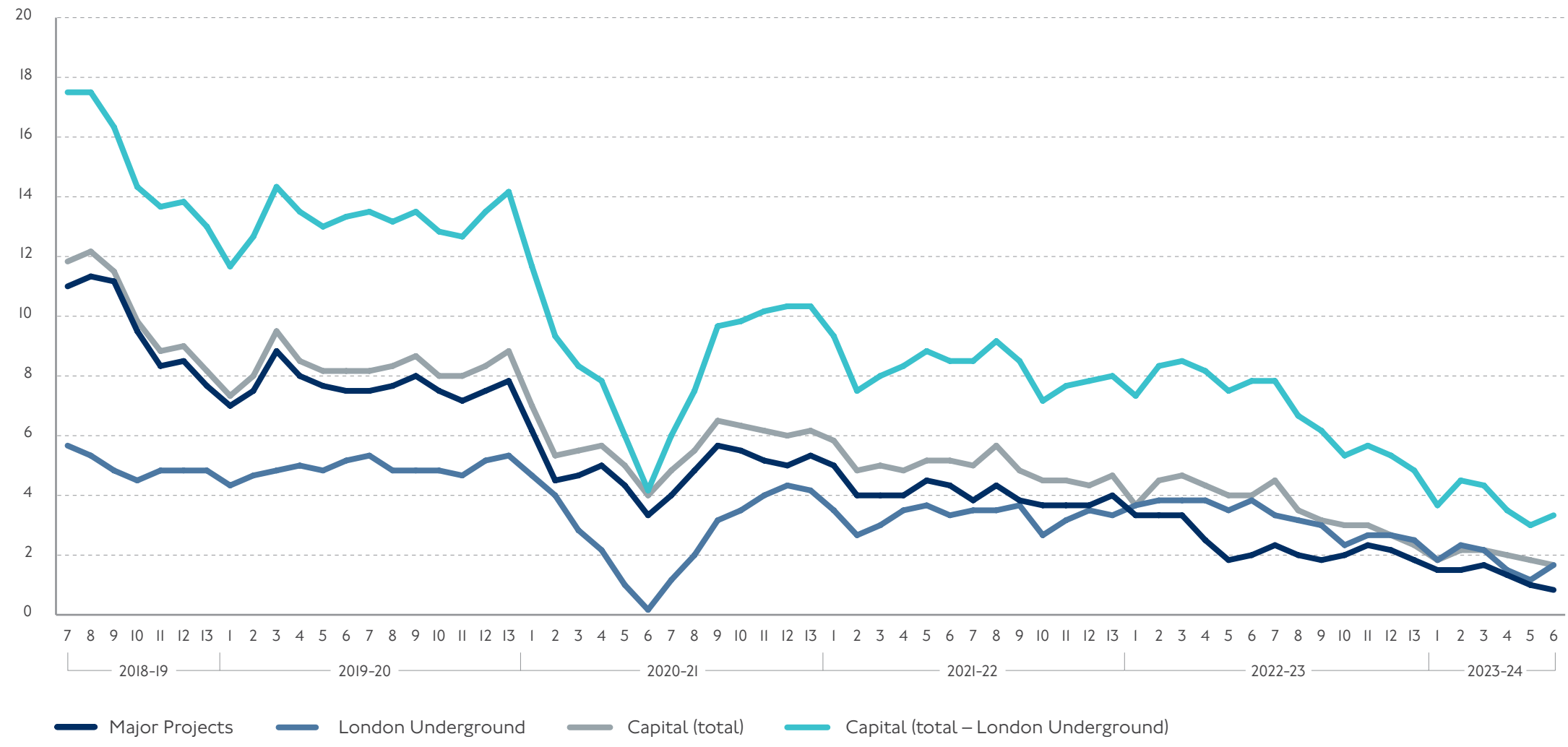
RIDDOR accident frequency rate
(per 100,000 hours worked)



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



Total Capital workforce injuries
(six-period average since 2018/19)



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 safety, 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.

We manage the city's red route strategic roads and are responsible for the maintenance, management and operation of more than 6,000 sets of traffic lights across the capital. The London boroughs are responsible for all the remaining roads within their boundaries. The experience, reliability and accessibility of our services are fundamental to Londoners' quality of life. Safety remains our number one priority and we continue to work tirelessly to improve safety across the network for both colleagues and customers.

Our vision is to be a strong, green heartbeat for London. We are investing in green infrastructure, improving walking and cycling, reducing carbon emissions, and making the city's air cleaner. The Ultra Low Emission Zone, and fleets of increasingly environmentally friendly and zero-emission buses, are helping to tackle London's toxic air. We are also improving public transport options, particularly in outer London, to ensure that more people can choose public transport or active travel over using their vehicles.

That is why we are introducing the outer London Superloop bus network, providing express bus routes circling the entire capital, connecting outer London town centres, railway stations, hospitals and transport hubs.

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

The Elizabeth line, which opened in 2022, has quickly become one of the country's most popular railways, adding 10 per cent to central London's rail capacity and supporting new jobs, homes and economic 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 and safe 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 are creating brighter journeys and a better city.

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November 2023

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