

Meeting: Programmes and Investment Committee

Date: Wednesday 20 July 2022

Time: 10:00am

**Place: Conference Rooms 1 and 2,
Ground Floor, Palestra, 197
Blackfriars Road, London, SE1
8NJ**

Members

Ben Story (Chair)

Dr Nelson Ogunshakin OBE (Vice-Chair)

Seb Dance

Julian Bell

Dr Lynn Sloman MBE

Peter Strachan

Government Special Representative

Becky Wood

Copies of the papers and any attachments are available on [tfl.gov.uk How We Are Governed](https://tfl.gov.uk/How-We-Are-Governed).

This meeting will be open to the public and webcast live on [TfL YouTube channel](#), except for where exempt information is being discussed as noted on the agenda.

There is access for disabled people and induction loops are available. A guide for the press and public on attending and reporting meetings of local government bodies, including the use of film, photography, social media and other means is available on www.london.gov.uk/sites/default/files/Openness-in-Meetings.pdf.

Further Information

If you have questions, would like further information about the meeting or require special facilities please contact:

Shamus Kenny, Head of Secretariat; Email: Secretariat02@tfl.gov.uk.

For media enquiries please contact the TfL Press Office; telephone: 0343 222 4141; email: PressOffice@tfl.gov.uk

Howard Carter, General Counsel
Tuesday 12 July 2022

**Agenda
Programmes and Investment Committee
Wednesday 20 July 2022**

1 Apologies for Absence and Chair's Announcements

2 Declarations of Interests

General Counsel

Members are reminded that any interests in a matter under discussion must be declared at the start of the meeting, or at the commencement of the item of business.

Members must not take part in any discussion or decision on such a matter and, depending on the nature of the interest, may be asked to leave the room during the discussion.

**3 Minutes of the Meeting of the Committee held on 18 May 2022
(Pages 1 - 8)**

General Counsel

The Committee is asked to approve the minutes of the meeting of the Committee held on 18 May 2022 and authorise the Chair to sign them.

4 Matters Arising and Actions List (Pages 9 - 12)

General Counsel

The Committee is asked to note the updated actions list.

5 Use of Delegated Authority (Pages 13 - 16)

General Counsel

The Committee is asked to note the paper.

6 Investment Programme Report - Periods 11-13, 2021/22 (Pages 17 - 92)

Chief Capital Officer and Chief Operating Officer

The Committee is asked to note the paper and exempt supplementary information on Part 2 of the agenda.

7 Independent Investment Programme Advisory Group Quarterly Report (Pages 93 - 98)

General Counsel

The Committee is asked to note the Independent Investment Programme Advisory Group's quarterly report, the management response and the exempt supplementary information on Part 2 of the agenda.

8 TfL Project Assurance Update (Pages 99 - 100)

General Counsel

The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda.

9 Review of Progress on Value for Money (Pages 101 - 110)

Interim Director Investment Delivery Planning

The Committee is asked to note the paper.

10 London Underground Four Lines Modernisation Programme
(Pages 111 - 118)

Chief Capital Officer and Interim Director Investment Delivery Planning

The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda and approve additional unbudgeted Programme and Project Authority.

11 Northern Line Extension (Pages 119 - 126)

Chief Capital Officer and Interim Director Investment Delivery Planning

The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda.

12 London Underground Infrastructure Renewals Programme
(Pages 127 - 144)

Interim Director Investment Delivery Planning

The Committee is asked to note the paper and agree that the London Underground (LU) Renewals and Lifts & Escalators Programmes be consolidated into a LU Infrastructure Renewals Programme with a total Programme and Project Authority of £1,192.2m and agree that the LU Fleet, Track and Signals Programmes be consolidated into a LU Train Systems Programme with a total Programme and Project Authority of £1,790.3m.

13 East London Line Housing Infrastructure Programme (Pages 145 - 156)

Interim Director Investment Delivery Planning

The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda and approve additional Financial Authority and Programme and Project Authority to continue the East London Line Housing Infrastructure Fund Programme.

14 Public Transport Programme (Pages 157 - 172)

Interim Director Investment Delivery Planning

The Committee is asked to note the and approve additional budgeted Programme and Project Authority for the continuation of the Public Transport Programme through to the end of 2023/24.

15 Surface Technology Programme 2022/23 (Pages 173 - 192)

Interim Director Investment Delivery Planning

The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda and approve Programme and Project Authority for the Surface Transport Technology Programme and approve the transfer of the innovation Fund out of the Programme into operating expenditure, which has no impact on the Programme's Programme and Project Authority.

16 Road User Charging (Pages 193 - 200)

Interim Director of Investment Planning

The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda.

17 Members' Suggestions for Future Discussion Items (Pages 201 - 204)

General Counsel

The Committee is asked to note the forward plan and is invited to raise any suggestions for future discussion items for the forward plan and for informal briefings.

18 Any Other Business the Chair Considers Urgent

The Chair will state the reason for urgency of any item taken.

19 Date of Next Meeting

Wednesday 19 October 2022 at 10.00am

20 Exclusion of the Press and Public

The Committee is recommended to agree to exclude the press and public from the meeting, in accordance with paragraph 3 of Schedule 12A to the Local Government Act 1972 (as amended), in order to consider the following items of business.

Agenda Part 2

21 Investment Programme Report - Periods 11-13, 2021/22

(Pages 205 - 218)

Exempt supplementary information relating to the item on Part 1 of the agenda.

22 Independent Investment Programme Advisory Group Quarterly Report (Pages 219 - 248)

Exempt supplementary information relating to the item on Part 1 of the agenda.

23 TfL Project Assurance Update (Pages 249 - 256)

Exempt supplementary information relating to the item on Part 1 of the agenda.

24 London Underground Four Lines Modernisation Programme
(Pages 257 - 272)

Exempt supplementary information relating to the item on Part 1 of the agenda.

25 Northern Line Extension (Pages 273 - 276)

Exempt supplementary information relating to the item on Part 1 of the agenda.

26 East London Line Housing Infrastructure Programme (Pages 277 - 286)

Exempt supplementary information relating to the item on Part 1 of the agenda.

27 Surface Technology Programme 2022/23 (Pages 287 - 294)

Exempt supplementary information relating to the item on Part 1 of the agenda.

28 Road User Charging (Pages 295 - 304)

Exempt supplementary information relating to the item on Part 1 of the agenda.

Transport for London

Minutes of the Programmes and Investment Committee

Conference Rooms 1 and 2, Ground Floor, Palestra,
197 Blackfriars Road, London, SE1 8NJ

10.00am, Wednesday 18 May 2022

Members of the Committee

Ben Story (Chair)
Julian Bell
Seb Dance
Dr Lynn Sloman MBE
Peter Strachan (present for items to 23/05/22)

Government Special Representative

Becky Wood

Executive Committee

Andy Byford Commissioner
Howard Carter General Counsel
Stuart Harvey Chief Capital Officer

Staff

Alexandra Batey Director of Investment Delivery Planning (via Teams)
Daniel Champion Head of Investment Delivery Planning – Air Quality,
Technology and Environment (for Minute 24/05/22)
Michael Cooper Director, Project Management Office
Philip Hewson Head of Procurement – Strategy and Performance
Lorraine Humphrey Director of Risk and Assurance (via Teams)
Shamus Kenny Head of Secretariat
Alex Main Senior Capital Investment Planning Manager (for Minute
26/05/22) (via Teams)
Rachel McLean Financial Director, TfL Operations, and Chief Finance Officer,
Crossrail (via Teams)
Jamie Mordue Senior Committee Officer, Secretariat
James Norris Interim Head of Project Assurance
David Rowe Head of Investment Delivery Planning - Major Projects (for
Minute 25/05/22)
Rachel Sherry Head of Finance, Major Projects
Jadon Silva Supply Chain Director
Garry Sterritt Head of Asset Investment (for Minute 25/05/22)
Shashi Verma Chief Technology Officer and Director of Strategy
Jadon Silva Supply Chain Director (via Teams)
Jonathan Wharfe Supply Chain Director (via Teams)

Independent Investment Programme Advisory Group (IIPAG)

Alison Munro Chair, IIPAG
Jonathan Simcock IIPAG Member (via Teams)

17/05/22 Apologies for Absence and Chair's Announcements

Apologies for absence were received from Dr Nelson Ogunshakin OBE. Peter Strachan would need to leave the meeting at 11.00am.

The meeting was being broadcast live on TfL's YouTube channel to ensure the public and press could observe the proceedings and decision-making.

The meeting would be the last Committee meeting for Alexandra Batey before she took up her new role as Phase 2B Development Director at HS2. The Committee thanked Alexandra for the tangible and lasting contributions she made to shaping the organisation in her 20 years with TfL. The Chair stated that the loss of another talented senior officer highlighted the need to secure certainty on TfL's future funding and address pay disparities with other major transport and infrastructure providers. The Commissioner echoed the Chair's comments and praised the world class contribution she had made to TfL and gave his best wishes for the future.

Alexandra Batey thanked the Commissioner and the Committee for the support they had shown. She was proud to have gone from graduate to director and to have helped shape the future of TfL.

The meeting would also be the last for Jamie Mordue in the Secretariat. The Commissioner and the Committee thanked Jamie for his service to Members and the Committee and wished him well for the future.

Financial Authority was currently provided through the two year Budget for 2021/2022 and 2022/23, approved by the Board on 28 July 2021. The current funding agreement with Government expired on 24 June 2022. Any Authority granted at the meeting which related to both the current funding period and commitments that extend beyond the period of the Business Plan and Budget may need to be revised as part of future budgets to be considered by the Board. If additional funding was not available, a prioritisation of the TfL Investment Programme would be required and some programmes and projects would not be taken forward and revised authority would be sought as appropriate.

All approvals given would be overseen in accordance with TfL business controls in respect of draw down.

The Chair reminded those present that safety was paramount at TfL and encouraged Members to raise any safety issues during discussions on a relevant item or with TfL staff after the meeting. No matters were raised.

18/05/22 Declarations of Interests

The Chair had taken up a new role as Chief Operating Officer of Sustainable Development Capital LLP. There was unlikely to be any significant issues where conflicts of interest arose.

Julian Bell had established a management consultancy company and was no longer a strategic advisor for the Built Environment Communications Group. He had also

stood down as a councillor for the London Borough of Ealing but would continue to represent London Councils on the Board until his term of office expired.

Members confirmed that their declarations of interests, as published on tfl.gov.uk, were up to date and there were no interests to declare that related specifically to items on the agenda.

19/05/22 Minutes of the Meeting of the Committee held on 2 March 2022

The minutes of the meeting of the Committee held on 2 March 2022 were approved as a correct record and signed by the Chair.

20/05/22 Matters Arising and Actions List

Howard Carter introduced the paper, which set out progress against actions agreed at previous meetings of the Committee.

The Committee noted the actions list.

21/05/22 Use of Delegated Authority

Howard Carter introduced the paper, which provided an update on the use of delegated authority by the Committee, through the use of Chair's Action or of Procurement Authority and Programme and Project Authority, in respect of matters within the Committee's remit, granted by the Commissioner and the Chief Finance Officer.

Since the meeting on 2 March 2022 there had been three uses of Chair's Action in relation to (a) approvals from the 2 March 2022 meeting, as it was held online; (b) Expanding Pay As You Go on Rail in the South East; and (c) Healthy Streets Programme Continuation.

The Commissioner had approved three Procurement Authority requests in relation to the Piccadilly Line Upgrade Track – Manufacturing Contract for Composite Conductor Rail and Accessories; London-wide Ultra Low Emission Zone (Road User Charging 2023 Scheme); and the variation of the Managed Services contract to cover additional business critical changes to the SAP system.

The Chief Finance Officer had approved one Procurement Authority request in relation to Project Support Agreement – Four Lines Modernisation Wayside Works Agreement Wayside Delivery and Wayside Asset Protection.

There had been no Mayoral Directions to TfL within the Committee's remit.

The Committee noted the paper.

22/05/22 Independent Investment Programme Advisory Group Quarterly Report

James Norris introduced the report, which provided an update on the Independent Investment Programme Advisory Group (IIPAG) work undertaken since the last report.

IIPAG had completed work on two cross-cutting areas. A review of the Project Management Office (PMO) found that the PMO had been reinvigorated and good progress had been made since 2021. Some areas remained underdeveloped. No specific recommendations were made other than to encourage the PMO to maintain momentum. A review of the treatment of risk found that there was an under provision of risk in some cases.

Members welcomed the reviews and agreed that it was important to track the outcome of decisions, particularly when there were lessons to learn.

Loss of talent remained a risk for TfL. Resourcing in the PMO would need some reinforcement; it was noted that the jobs market for these skills was currently very active and TfL was also looking at how it could support its supply chain.

The reorganisation of senior roles clarified accountabilities and provided better governance. This would also further guard against optimism bias, improvements around which were evident through the openness around RAG ratings in the Investment Programme Reports.

Long term funding certainty would help TfL to retain key staff involved in project gateway reviews and stifle optimism bias where only a certain number of projects were able to be funded.

The Commissioner was encouraged by the Prime Minister's comments on a potential Crossrail 2 and the Bakerloo Line Extension and noted that TfL remained committed to long term financial sustainability.

The Committee thanked Kenny Laird for the contributions he made to the work of the Committee as a member of IIPAG. Recruitment for two IIPAG roles was due to start, to ensure it had sufficient resource, including for the possibility of providing assurance to TTL Properties Limited.

The Committee noted the report and the exempt supplementary information on Part 2 of the agenda.

23/05/22 TfL Project Assurance Update

James Norris introduced the paper, which provided an update on the project assurance work undertaken between 21 January and 31 March 2022 and the key findings from the reviews.

Seven detailed reviews had been conducted, of which the Independent Investment Programme Advisory Group was involved in five. The reviews gave rise to a total of

25 recommendations being made, of which none were considered to be critical issues.

There had been an improvement in the close out of recommendations in Quarter 4 of 2021/22. There were two overdue critical recommendations relating to business cases for London Underground projects and Project Assurance continued to work with the teams and progress was being made on both.

Members noted that there was recognition across TfL that the standard of business cases needed to be elevated but that it was not always straight forward to demonstrate the value for money of a project that improved the safety of a working environment which was already very safe.

Members asked that future reports distinguish between critical and non-critical recommendations in the charts and when a recommendation was more than three months overdue. **[Action: James Norris]**

The Committee noted the paper and the exempt supplementary information on Part 2 of the agenda.

24/05/22 London Underground Technology Programme

Alexandra Batey and Daniel Champion introduced the paper, which provided an update on the rolling programme to renew operational technology in London Underground (LU), to enable TfL to continue to use technology effectively to support operations, ensure compliance with relevant legislation and drive improvements for customers.

The Programme had delivered 7,000 new handheld devices to help staff provide excellent customer service. These were delivered on time and under budget. In support of Vision Zero, 4,500 body worn cameras had been distributed to front line staff; footage from body worn cameras had already been used to prosecute those who abused staff.

Good progress had been made in larger projects such as Connect, where core radio hardware and software had been renewed. A reduction in hardware cost resulted in a £6.7m reduction in project cost.

Changes to the Estimated Final Costs (EFCs) were as a result of changes to Asset Management Information System and Station Security Technology Integration Programme.

The plan for the 2022/23 financial year was to address key obsolescence and back office renewals through 15 projects.

In response to financial constraints, there had been a reprioritisation of non-essential spend. Noting that TfL would not operate unsafe assets, further reductions would introduce operational risks.

A significant proportion of the requested authority was for the Future Operational Network, which related to the renewals of existing systems and the future strategy

post 2026. The amount requested was derived through the prioritisation process, whereby each portfolio was given an allocation based on the prioritisation of its assets. Future papers would make clearer how amounts requested were determined to be appropriate.

Since the last submission to the Committee, the paper had been updated to provide an overview of significant projects, which compared baseline and current EFCs and completion dates. Future papers would include baseline benefit-cost ratios and value for money figures. Members stated that visibility and accuracy of the figures were important, particularly given the funding situation. Where additional authority was requested a clear explanation of why the amount requested was correct and appropriate should be provided.

Members would receive an update on work done on the business planning process and prioritisation to determine allocations for portfolios in the second half of 2022.

[Action: Director of Investment Delivery Planning]

The Committee noted the paper and:

- 1 approved additional Programme and Project Authority of £63.3m for the London Underground Technology Programme, giving total Programme and Project Authority of £225.9m; and**
- 2 noted that Procurement Authority in respect of the various elements of the London Underground Technology Programme will be sought at officer level in accordance with Standing Orders.**

25/05/22 Surface Transport Asset Renewals Programme

Alexandra Batey introduced the paper, which provided an update on the programmes that delivered essential asset renewals and managed the state of good repair (SOGR) to provide a safe and operable network. The current Programme and Project Authority would apply through to the end of 2024/25. David Rowe also spoke to the item.

The Programme's budget for 2022/23 had been decreased to ensure it was within the overall £600m allocation from the Budget for capital renewals across all of TfL. This was significantly lower than the 'Do Minimum' scenario needed to maintain the current condition of the assets. Consequently, TfL's assets were now subject to a 'Managed Decline' scenario, where it was forecast that asset condition would deteriorate in 2022/23.

A work bank of schemes was being developed for the future, so the schemes would be ready if certainty of funding was secured.

Restrictions on assets, such as reducing the speed limit on the A40 from 50mph to 40mph, were taken on a case by case basis and safety remained paramount.

The Commissioner noted that if assets continued to degrade, it would cost more in the long-term and take longer to return to a SOGR. TfL would not allow assets to be unsafe whilst in operation. London's transport system was nationally strategically

significant, and it was a false economy to allow its assets to decline below a SOGR. Investment in London's transport system helped to drive London's economy, which in turn helped to fund development in other parts of the country.

Members stated that Londoners paying to use any mode of transport would expect the assets of that mode to be maintained to a SOGR.

The Committee noted the paper and:

- 1 agreed that the current Programme and Project Authority of £648m will apply through to the end of 2024/25; and**
- 2 noted that Procurement Authority in respect of the various elements of the Surface Transport Assets Programme will be sought at officer level in accordance with Standing Orders.**

26/05/22 Capital Efficiencies Report, 2021/22

Stuart Harvey introduced the paper, which set out how TfL delivered on the milestones contained in the Capital Efficiency Plan and set out the efficiencies realised during the 2021/22 financial year. The report did not currently include efficiencies that would be delivered through the organisational changes.

In a 'Managed Decline' scenario, aspirations for efficiencies were reduced. Where there was funding certainty, such as with the Piccadilly Line Upgrade Programme, it was possible to deliver efficient procurement. Conversely, on procurement for Highways the same efficiencies could not be delivered.

The target for efficiencies in 2021/22 had been achieved through business as usual activities. Capital Efficiencies workstreams were progressing well; the quality of pathway compliance was being improved further, extensive 'make or buy' thinking was in place to ensure engineering resource was used efficiently, and thinking around the use of certain types of contract to ensure the procurement strategy maximised value for money.

As many of the efficiencies delivered thus far would enable TfL to deliver greater efficiencies in the longer term, it was important to track progress in embedding them into the organisation.

Members were encouraged by the progress made.

The Committee noted the report and the exempt supplementary information on Part 2 of the agenda.

27/05/22 Members' Suggestions for Future Discussion Items

Howard Carter introduced the current forward plan for the Committee.

Members asked to visit the Old Street project.

[Action: Secretariat]

The Committee noted the forward plan.

28/05/22 Any Other Business the Chair Considers Urgent

There was no urgent business.

29/05/22 Date of Next Meeting

The next scheduled meeting of the Committee would be held on Wednesday 20 July 2022 at 10.00am.

30/05/22 Exclusion of the Press and Public

The Committee agreed to exclude the press and public from the meeting, in accordance with paragraph 3 of Schedule 12A to the Local Government Act 1972 (as amended), when it considered the exempt information in relation to the items on: Independent Investment Programme Advisory Group Quarterly Report; TfL Project Assurance Update; and Capital Efficiencies Report.

The meeting closed at 12.10pm.

Chair: _____

Date: _____

Programmes and Investment Committee



Date: 20 July 2022

Item: Matters Arising and Actions List

This paper will be considered in public

1 Summary

1.1 This paper informs the Committee of progress against actions agreed at previous meetings.

2 Recommendation

2.1 **The Committee is asked to note the Actions List.**

List of appendices to this report:

Appendix 1: Actions List

List of Background Papers:

Minutes of previous meetings of the Programmes and Investment Committee.

Contact Officer: Howard Carter, General Counsel
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Programmes and Investment Committee Action List (reported to the meeting on 20 July 2022)

Actions from the meeting of the Programmes and Investment Committee held on 18 May 2022

Minute No.	Description	Action By	Target Date	Status note
23/05/22	TfL Project Assurance Update – Recommendations Members asked that future reports distinguish between critical and non-critical recommendations in the charts and when a recommendation was more than three months overdue.	James Norris	July 2022	Completed. This has been addressed in the paper on the agenda.
24/05/22	London Underground Technology Programme – portfolio prioritisation Members would receive an update on work done on the business planning process and prioritisation to determine allocations for portfolios in the second half of 2022.	David Rowe	September 2022	This will be addressed in a planned business planning discussion for Members. Dates will be canvassed for September 2022.
27/05/22	Members’ Suggestions for Future Discussion Items Members asked to visit the Old Street project.	Secretariat	August 2022	Dates will be canvassed for August 2022.

Actions following approval of authority using Chair’s Action

Description	Action By	Target Date	Status note
Healthy Streets Continuation Programme: Old Street The Chair requested that the Independent Investment Programme Advisory Group (IIPAG) look at the increase in estimated final cost for Old Street.	IIPAG	July 2022	Completed. This is included in IIPAG’s quarterly report on the agenda.

Actions from previous meetings of the Committee

Minute No.	Description	Action By	Target Date	Status note
06/03/22	<p>Investment Programme Report (IPR) – Periods 8, 9 and 10: list of portfolios</p> <p>Members stated that it would also be useful for the report to set out what was included in the portfolios.</p>	Stuart Harvey/ David Rowe	July 2022	Completed. The IPR on the agenda includes this information.
72/12/21 (1)	<p>Investment Programme Report – Quarter 3, 2021/22: Value for money and Benefit-Cost Ratios</p> <p>The Committee asked that, where available, the value for money (VfM) calculations be included in future reports and, in instances where a project has been descoped, it be shown how that increased the VfM [and how the Benefit Cost Ratio has changed].</p>	Stuart Harvey / David Rowe	Ongoing	Work is ongoing; the IPR report will continue to be refined as and when data is available.
72/12/21 (2)	<p>Investment Programme Report – Quarter 3, 2021/22: Tottenham Hale station</p> <p>A background note on Tottenham Hale station would be circulated to Members in early 2022, to set out how the project was delivered against the original estimated final cost and delivery date.</p>	David Rowe	July 2022	A note will be provided.

Programmes and Investment Committee



Date: 20 July 2022

Title: Use of Delegated Authority

This paper will be considered in public

1 Summary

- 1.1 This is a standing item on the agenda to inform the Committee of any use of delegated authority by the Committee, through Chair's Action, or of Procurement Authority and Programme and Project Authority (in respect of matters within the Committee's remit) granted by the Commissioner and the Chief Finance Officer in accordance with delegated authorities under TfL's Standing Orders since the last meeting of the Committee. The paper also provides information on Mayoral Directions to TfL within the Committee's remit.
- 1.2 Since the last meeting of the Committee, on 18 May 2022, there have been:
 - (a) no uses of specific authority delegated by the Board;
 - (b) no use of Chair's Action;
 - (c) no approvals of Programme and Project Authority or Procurement Authority by the Commissioner nor by the Chief Finance Officer; and
 - (d) no Mayoral Directions within the Committee's remit.
- 1.3 A similar report is submitted to the Finance Committee and the Land and Property Committee in respect of the use of Chair's Action and of Authorities granted by the Commissioner and the Chief Finance Officer and of relevant Mayoral Directions that fall within the remit of those Committees.

2 Recommendation

- 2.1 **The Committee is asked to note the paper.**

3 Use of authority delegated by the Board

- 3.1 There have been no uses of authority delegated by the Board since the last meeting of the Committee.

4 Use of Chair's Action

- 4.1 Under Standing Order 113, in situations of urgency, the Board delegates to each of the Chair and the Chairs of any Committee or Panel the exercise of any functions of TfL on its behalf, including the appointment of Members to Committees and Panels. Any use of Chair's Action is reported to the next ordinary meeting.

4.2 There has been no use of Chair's Action since the last meeting of the Committee:

5 Programme and Project Authority Approvals

5.1 To enable an appropriate level of governance, processes are in place for the authorisation, control and reporting of projects.

5.2 Programme and Project Authority will normally be granted by the Committee for all programmes and projects as part of the defined Programmes within the overall Investment Programme. Where individual programmes or projects have a value in excess of £50m and have not already received full approval as part of a Programme, requests will be submitted to the Committee for consideration. Those programmes and projects with an estimated final cost of £50m or below, which have been approved by the Commissioner or the Chief Finance Officer, will be reported to subsequent meetings of the Committee.

5.3 Where the main contract has not yet been awarded, the Financial Authority and Estimated Final Cost may not be stated because they are commercially confidential.

Approvals by the Commissioner and Chief Finance Officer

5.4 Since the last meeting of the Committee, neither the Commissioner nor the Chief Finance Officer has approved any Programme and Project Authority requests within the Committee's remit.

6 Procurement Approvals

Approvals by the Commissioner and Chief Finance Officer

6.1 Since the last meeting of the Committee, neither the Commissioner nor the Chief Finance Officer has approved any Procurement Authority requests within the Committee's remit.

7 Mayoral Directions to TfL

7.1 The Greater London Authority Act 1999 (as amended) permits the Mayor to issue to TfL general directions as to the manner in which TfL is to exercise its functions or specific directions as to the exercise of its functions (or not to exercise a power specified in the direction). Directions are also often made in relation to the implementation of matters in respect of which the Mayor delegates statutory powers to TfL.

7.2 The Mayor makes Mayoral Directions through Mayoral Decisions. Papers for Mayoral Directions set out the financial and other implications. If those implications change over time, that will be reported to the Greater London Authority (GLA).

7.3 All Mayoral Decisions are issued in writing, with the information that is not exempt from publication included on the GLA's Decisions Database on its website: <https://www.london.gov.uk/about-us/governance-and-spending/good-governance/decisions?order=DESC>.

- 7.4 Mayoral Directions fall into three broad categories: those addressing technical issues relating to statutory powers; those related to commercial development activities; and those related to projects and programmes. Mayoral Directions relating to TfL are reported to the Board's Committees for discussion as soon as possible after they are received by TfL or published. Regular reports will list the relevant Directions for as long as they are applicable.
- 7.5 Annually the Audit and Assurance Committee considers the list as part of its consideration of the annual audit plan to ensure that appropriate audit resource is applied to assurance on TfL's work in implementing Mayoral Directions. This will also be kept under review at each quarterly meeting of that Committee.
- 7.6 A summary of current Mayoral Directions to TfL is maintained on the [How we are governed](#) page on our website, with links to the relevant Mayoral Decisions. That page will be updated as and when further Directions are made.
- 7.7 Mayoral Directions to TfL related to projects and programmes are reported to this Committee. There have been no Mayoral Directions to TfL within the Committee's remit since the last meeting.

List of appendices to this report:

None

List of Background Papers:

None

Contact Officer: Howard Carter, General Counsel
Email: HowardCarter@TfL.gov.uk

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Programmes and Investment Committee



Date: 20 July 2022

Item: Investment Programme Report – Periods 11, 12 and 13, 2021/22

This paper will be considered in public

1 Summary

- 1.1 The Investment Programme Report describes the progress and performance in Quarter 4, 2021/22 of a range of projects that will deliver world-class transport services to London.
- 1.2 A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendation

- 2.1 **The Committee is asked to note the report and the exempt supplementary information on Part 2 of the agenda.**

List of appendices to this report:

Appendix 1: Investment Programme Report Periods 11, 12 and 13, 2021/22

Exempt supplemental information is contained in a paper on Part 2 of the agenda

List of Background Papers:

None

Contact Officers: Gareth Powell, Chief Customer and Strategy Officer
Email: GarethPowell@tfl.gov.uk

Contact Officers: Andy Lord, Chief Operating Officer
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Contact Officers: Stuart Harvey, Chief Capital Officer
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Investment programme report

9 January 2022 – 31 March 2022

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-

Introduction

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



Purpose and scope

Purpose

Transport for London 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.

Our investment programme is the suite of projects comprising renewals and enhancements to maintain reliability and support growth in London.

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 supports London's growing population and economy, enhances the quality of life for Londoners and creates jobs.

Scope

This report provides an update on the projects that will further enhance our world-class transport services. It covers Periods II, I2 and I3, which runs from 9 January to 31 March 2022.

For each key project or programme, the financial and milestone data represent the position at the end of Period I3 and includes commentary on key achievements, progress and challenges. The report also contains updates on notable progress made since the last report.

The data displayed differs dependant 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 season that the specified event will occur. Seasons align to the Astronomical seasons with Winter covering January, February and March; Spring covering April, May and June; Summer covering July, August and September and Autumn covering October, November and December. For ongoing portfolios which aggregate a number of different projects, financial records of spend to date and forecast cost are provided for a discrete period of time.

Where financial information is commercially sensitive, it has been redacted. Performance over time graphs illustrating financial performance over the last four quarters have been introduced across all the programmes in the report. The commentary beside each graph explains any specific trends or changes to trends over a snapshot in time.



A royal launch for the transformational Elizabeth line in May



Our projects help improve and modernise customer experience

Investment programme delivery structure

Our investment programme is delivered by the following areas of the business: Major projects, London Underground, Surface transport and Professional services. The report is structured to reflect this.

Major projects

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

London Underground

This area covers stations, accessibility, track renewals, power, cooling and energy, rolling stock, and signalling and control.

Surface transport

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

Professional services

Our professional services area comprises Technology and data, Media and our Growth Fund.

Our performance

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



Safety performance

During the quarter, we have progressed with the implementation of measures to improve our short and long-term safety, health and environmental performance. We have continued to perform well on most of our safety metrics.

Coronavirus remained the top cause of short-term absences, significantly increasing from 30 per cent in Quarter 3, to 59 per cent in Quarter 4. Mental health and musculoskeletal-related health remained the top two causes of long-term absence, which is in line with the national average. Following the Government's decision to remove Plan B restrictions from 19 January 2022, we have been able to gradually return to the office. We have continued to make lateral flow tests available to our staff.

Capital delivery

In line with our organisational structure, data reported in this section covers our Major Projects Directorate, Surface transport project and programme delivery, and London Underground renewals and enhancements. Data from other areas where construction and maintenance work is done is reported separately in our public transport workforce data.

Quarterly performance

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



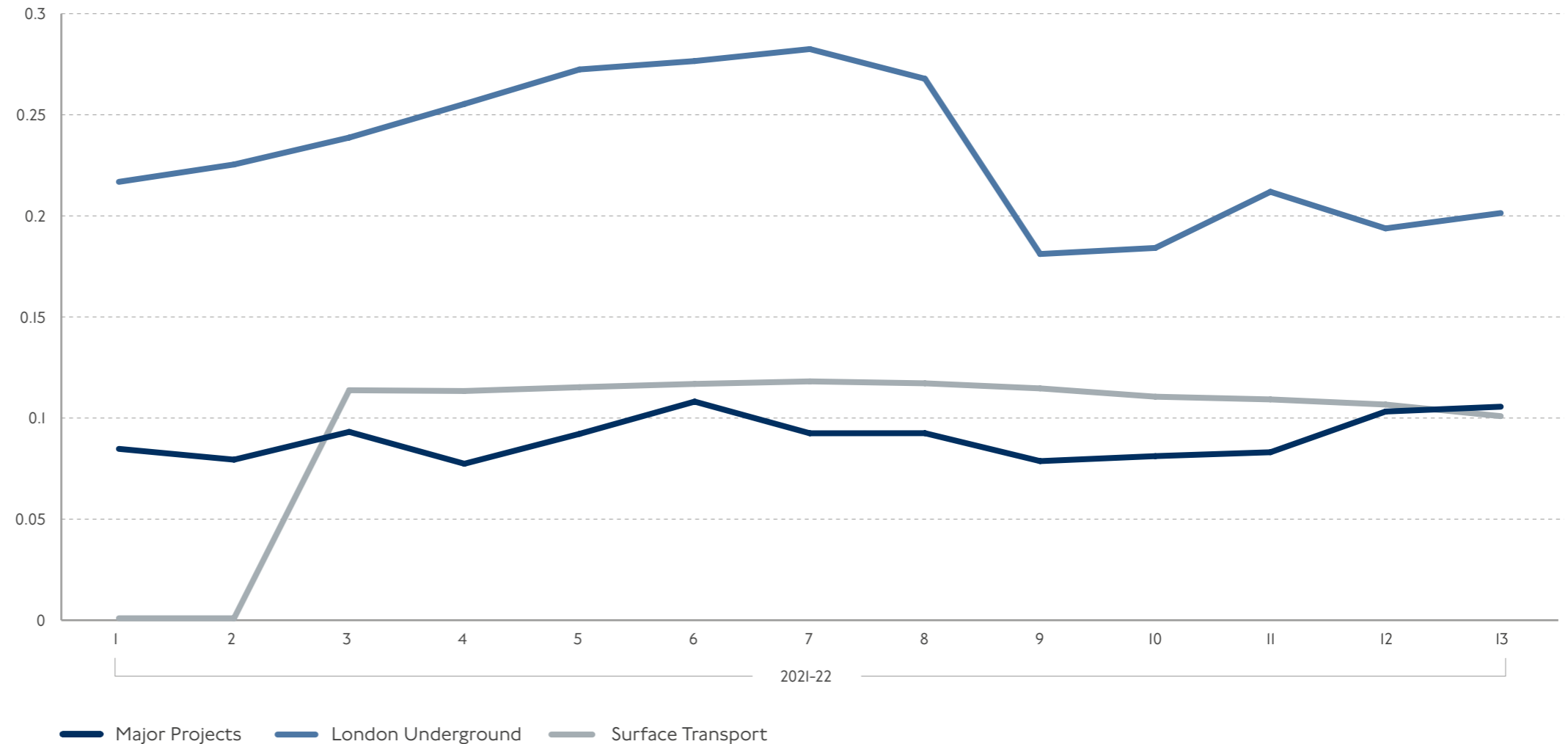
We continue to perform well on most of our safety metrics

In Quarter 4, there were four incidents reported under the RIDDOR in our capital delivery teams. This included two in the Major projects area and two in London Underground. Consequently, the accident frequency rates marginally increased in both areas, ending the quarter at 0.11 and 0.20 respectively. In Surface transport, the accident frequency rate fell to 0.10 due to no RIDDORs being reported during the quarter. As a result, Major projects and London Underground failed to meet their respective annual floor targets (thresholds) of 0.10 and 0.15, while Surface transport threshold of 0.15 was achieved.

While annual thresholds were not met in two of our capital teams, the accident frequency rate remained relatively stable on the previous year, with 15 RIDDORs in total reported compared with 14 in 2020/21. As further major projects conclude, along with a shift towards more reactive maintenance work, it is likely that our incident rates will continue to plateau in the coming quarters. As such, it remains essential that we closely analyse the root causes in order to identify safety improvements across our teams.

This year, the top immediate causes of RIDDORs in our capital teams were manual handling and slips, trips and falls. The most common root causes identified related to poor quality risk assessment or task planning, deviation from safe systems of work and substandard change management. In the majority of cases, TfL acts as the client under the Construction (Design and Management) Regulations 2015, with a third party appointed as the principal contractor.

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



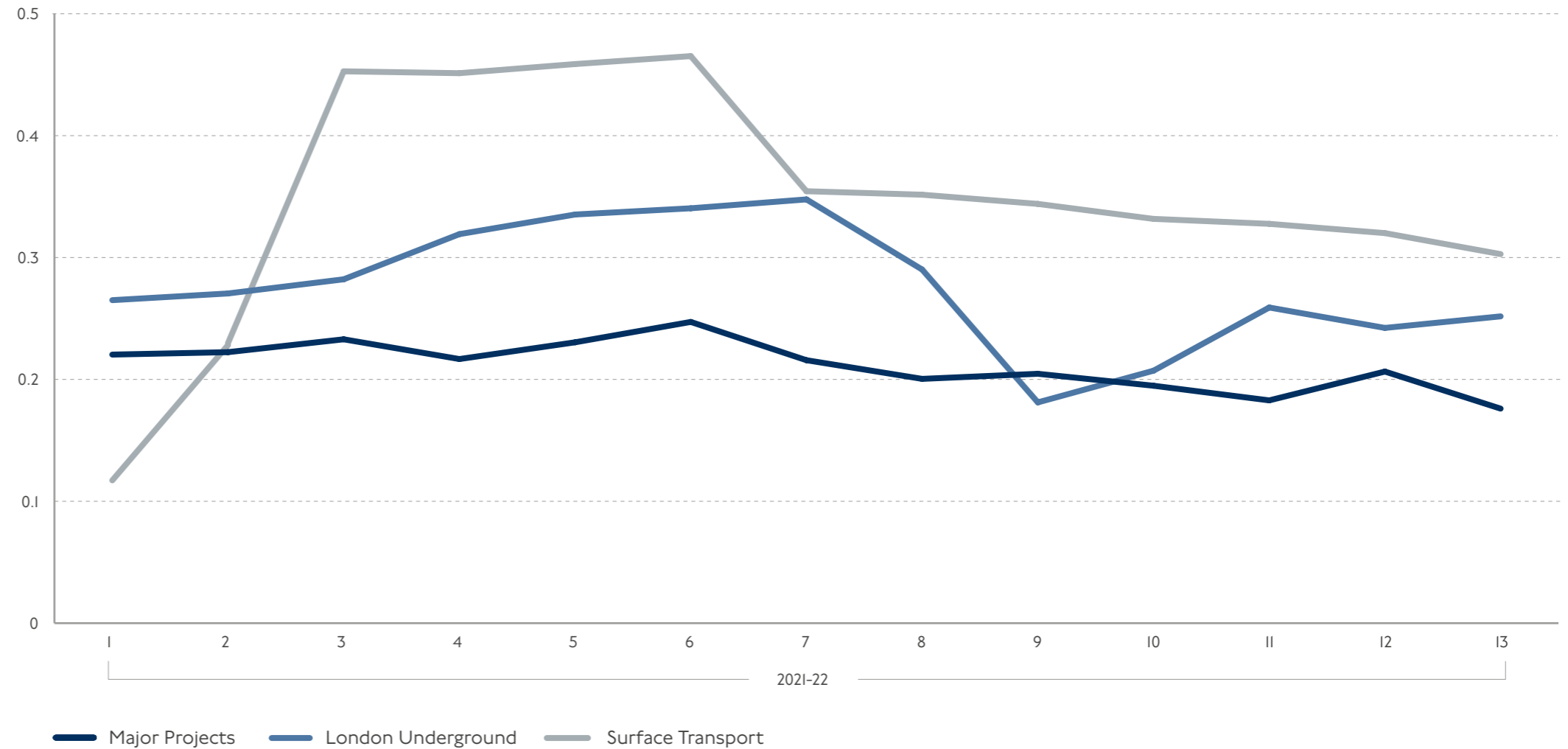
As such, it is imperative that we continue to work closely with the supply chain to share learnings from these incidents, enabling them to address root causes at source, and make adjustments to our assurance and supplier management processes to drive improved performance.

Lost time injuries (LTIs) are injuries which cause an employee to be absent for one or more shifts. There were seven LTIs reported in our capital teams during Quarter 4, an increase of six on Quarter 3. However, this increase is not reflected in the lost time injury frequency rates during the quarter due to rates being calculated based on average performance over the last 13 periods.

In total there were 24 LTIs in 2021/22, a decrease of two on 2020/21. Consequently, the rate for Major projects finished the year at 0.18, below the floor target (threshold) of 0.20. However, the threshold of 0.20 was not achieved in Surface transport and London Underground, with rates ending the year at 0.30 and 0.25 respectively. While not all thresholds across capital teams were met in 2021/22, there has been a significant long-term decline in the number of LTIs, falling from 53 in 2018/19.

Immediate and root causes of LTIs during 2021/22 were generally consistent with RIDDOR analysis, with changes to design, without consideration of how they could affect safe systems of work, also identified as a contributory factor in a number of incidents.

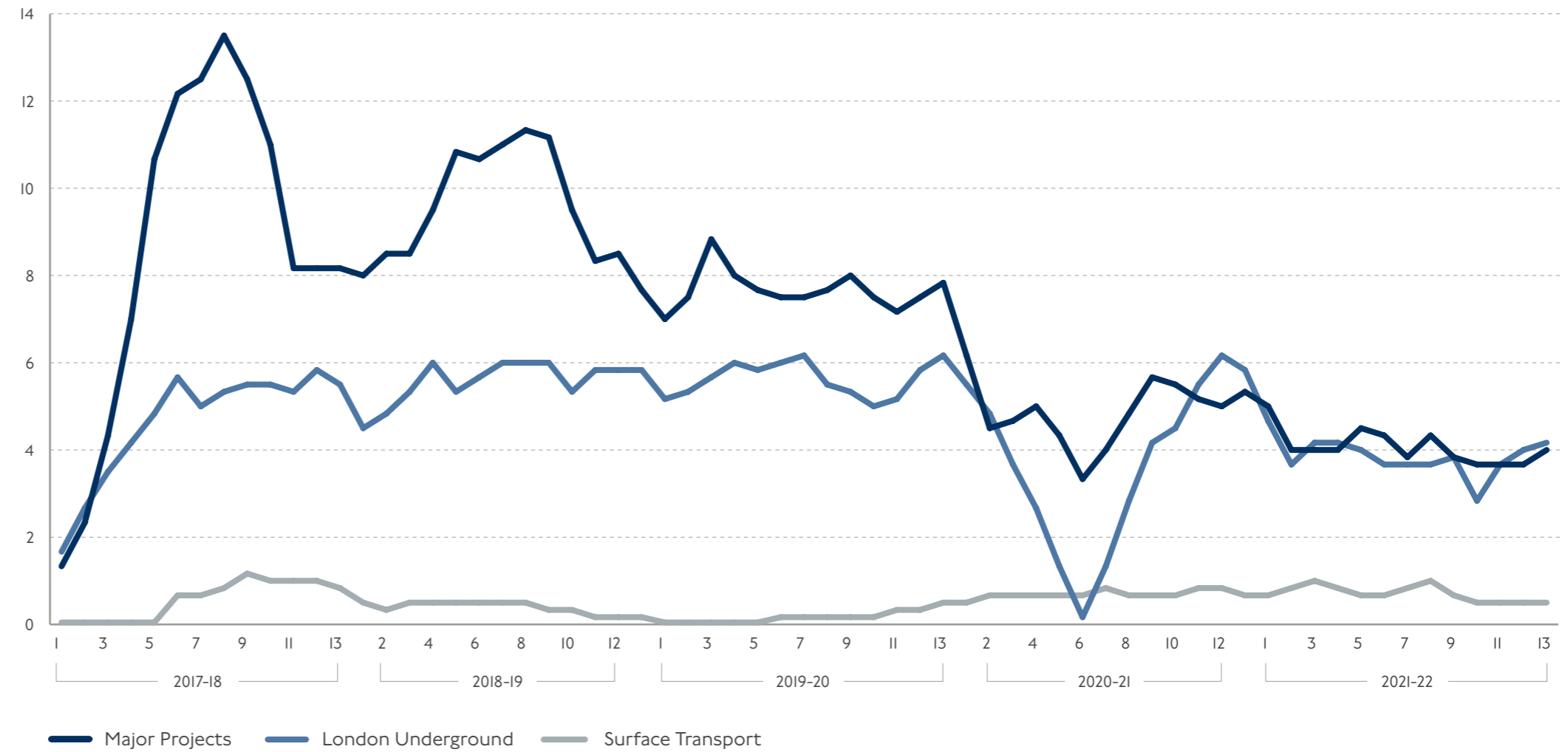
Lost time injury frequency rate
(per 100,000 hours worked)



There were 22 injuries across our capital delivery teams during the quarter, demonstrating a slight decrease on the previous quarter, in line with the reduction in hours worked. Injuries across teams remain well below pre-pandemic levels and continue the overall decline since 2017/18.

We are now seeing signs that the number of injuries is beginning to plateau, which is likely to continue over the coming quarters, as hours worked on site stabilise.

Total capital delivery physical workforce injuries (six-monthly average)





The Northern line now extends to Battersea Power Station

Schedule performance

We have achieved a number of significant milestones throughout the year

Northern Line Extension

On 20 September 2021, two new stations at Nine Elms and Battersea Power Station welcomed their first customers. The two step-free Zone 1 stations are set to dramatically improve the connectivity of these vibrant south London neighbourhoods and contribute to the capital's recovery from the pandemic.

Piccadilly line upgrade

We have begun assembly of the new passenger trains.

DLR rolling stock replacement programme

First train for the new fleet has been assembled ahead of testing.

Barking Riverside Extension

We have completed the construction of the viaduct to enable rail systems to be installed.

Four Lines Modernisation

We launched the passenger service between Monument and Sloane Square, in signal migration area four.

London Underground

We have developed a decarbonisation strategy.

London Underground asset performance

We have completed the Victoria line train overhaul programme.

London Underground asset renewals

We have installed 75 per cent of our one-person operation cameras on platforms.

16 life-expired traction isolation switches have been replaced, and we have installed 8km of new track and 18 new sets of points across the network.

Surface technology

We have completed the release of the intelligent transport system 2.0.

Surface assets

Construction work has started on site at the A40 Westway.

Surface air quality

The expansion of the world-leading ULEZ to the North and South Circular roads has now gone live.

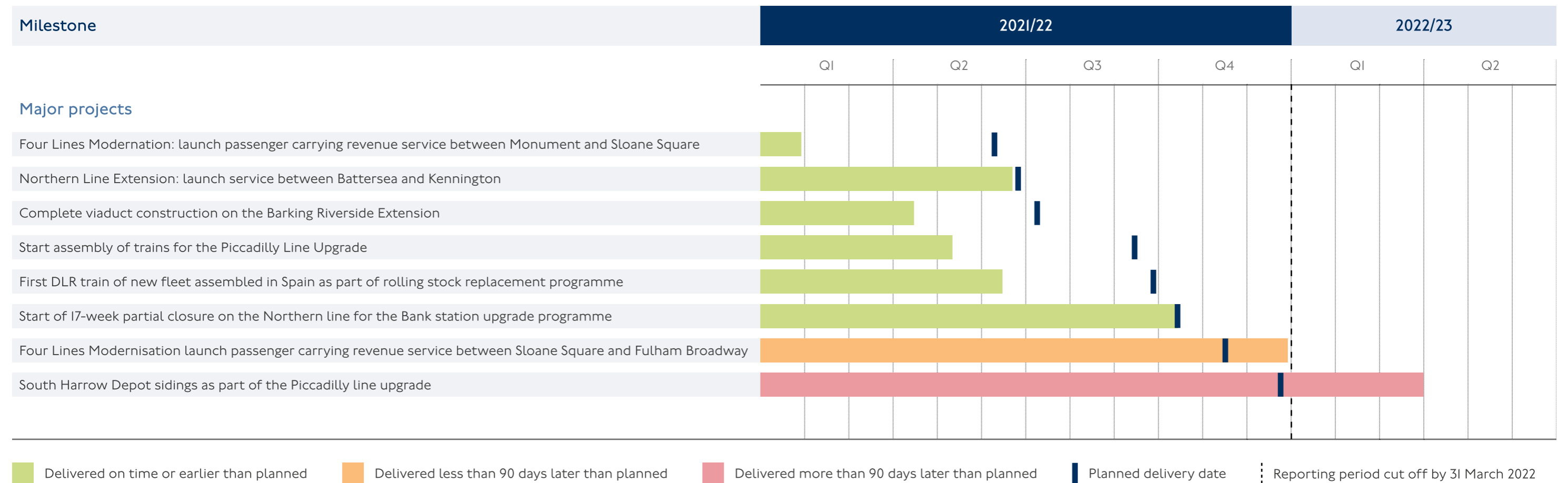
Surface Healthy Streets

We have opened the station entrance on Cowper Street and 5km of improved bus lanes have been achieved as part of the Bus Priority Programme.

Strategic milestones

We have delivered 17 out of 22 strategic milestones either on time or early this year

These are our strategic milestones for 2021/22. The hollow box shows when the milestone was due to be met, while the coloured block shows when it was achieved or is forecast to be achieved.



Strategic milestones 2021/22 (continued)



* Signed off by TfL Commissioner

While we have delivered 17 out of 22 strategic milestones either on time or early this year, we have continued to be subject to challenges resulting from the current funding uncertainty.

In November 2021, due to a lack of long-term funding security, we have moved to a 'managed decline' scenario for budgeting which restricts expenditure to committed enhancements and only the most essential renewal projects.

In response to the funding challenges and the need to drive capital efficiency, we have put into place several initiatives. These include improving project controls, implementing a new performance measurement baseline and improving investment planning. This ensures we only start the right projects and consider all available delivery options. We are also developing a strategic investment outcome framework to link the benefits to projects and show progress against them; this is a key input for the enhancement prioritisation work for the 2022/23 budget.

Other initiatives include benchmarking projects focused on setting savings targets, reporting improvements, and a review of governance focusing on clarifying accountabilities and decision-making responsibility to speed up processes so that projects run more smoothly. We are also looking at a long-term strategic engineering resourcing review to deliver efficient engineering outcomes.

While we await the decision on future funding certainty, we are continuing to seek efficiencies both via capital delivery and through business as usual activities, some of which may impact the projects and programmes in this report.

Milestones forecast to be late **Rotherhithe Tunnel**

Owing to the current funding and financing challenges we face, we have paused the tendering process for the detailed design and build stage. We are implementing a series of short-term measures, such as the recently installed over-height vehicle barrier, to ensure the tunnel remains safe and operable until the main refurbishment project is progressed.

Four Lines Modernisation

The milestone for signal migration area five was achieved on 27 March, which was 35 days later than the baseline date. The delay was due to ongoing software issues, which are being reviewed, and to incorporate all functionality for the safety and reliability of the migration area.

Piccadilly Line Upgrade

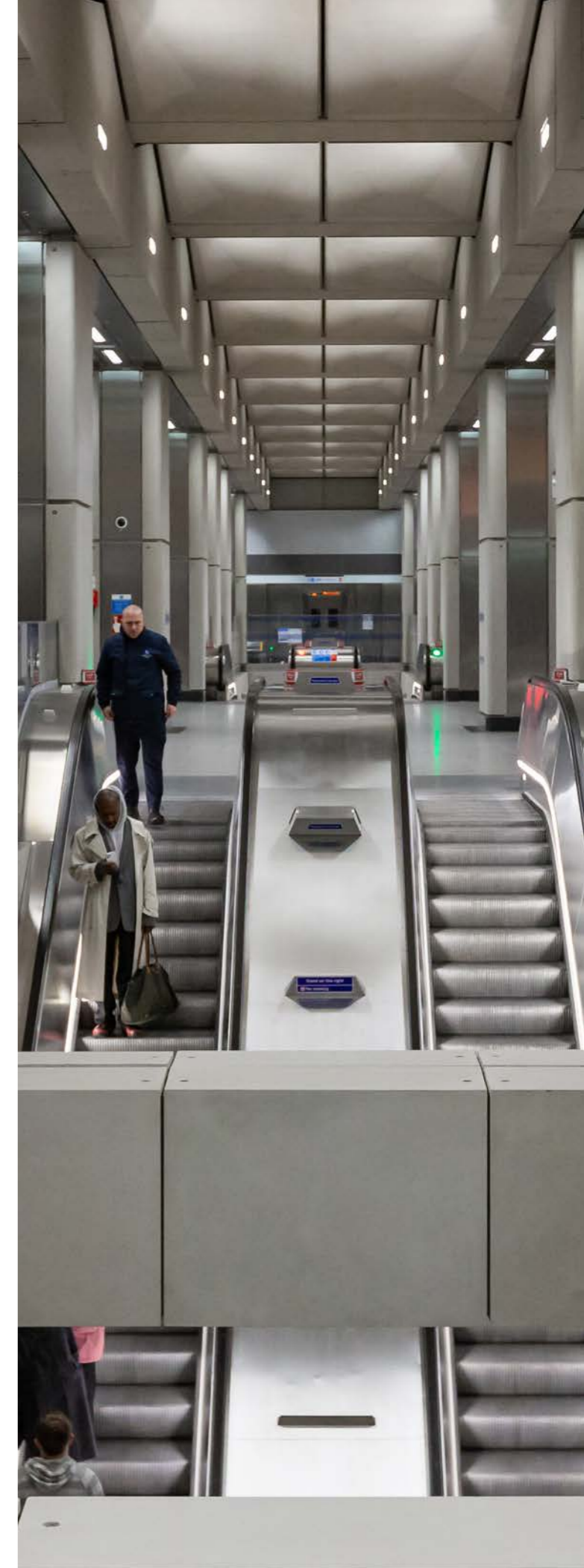
The South Harrow sidings milestone has been delayed by 110 days, due to late delivery of the signal and electrical designs and extended signal installation durations.

London Underground escalators

We have returned 17 out of 23 escalators to passenger service. The 18th escalator was returned to service 28 days later than planned due to a premature component failure. The remaining five escalators are in progress, with these forecast to return to service up to 61 days later than planned. This is owing to the increased complexity of integrating the new assets with the station infrastructure.

Central Line Improvement Programme

The first train was expected to be in service in March 2022, but the current forecast shows this will be more than 160 days late. The programme has been impacted by resourcing challenges, but work continues to recover time and deliver the project as quickly as possible.



We have returned 17 out of 23 escalators to service

Major projects

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



On-network stations improvement programme

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)
Winter 2022	94	0	94	94	0
Change since last Investment programme report					
No change	I	(I)	No change	No change	

Performance over time

The forecast end date represents delivery of upgrades at the surface stations on the Elizabeth line route.

Since the programme and project authority was awarded in 2015/16, our forecast completion date has been delayed by approximately two years due to the pandemic and delays to Network Rail's works in the western section. Despite this, our estimated forecast cost has remained relatively stable.

Programme update

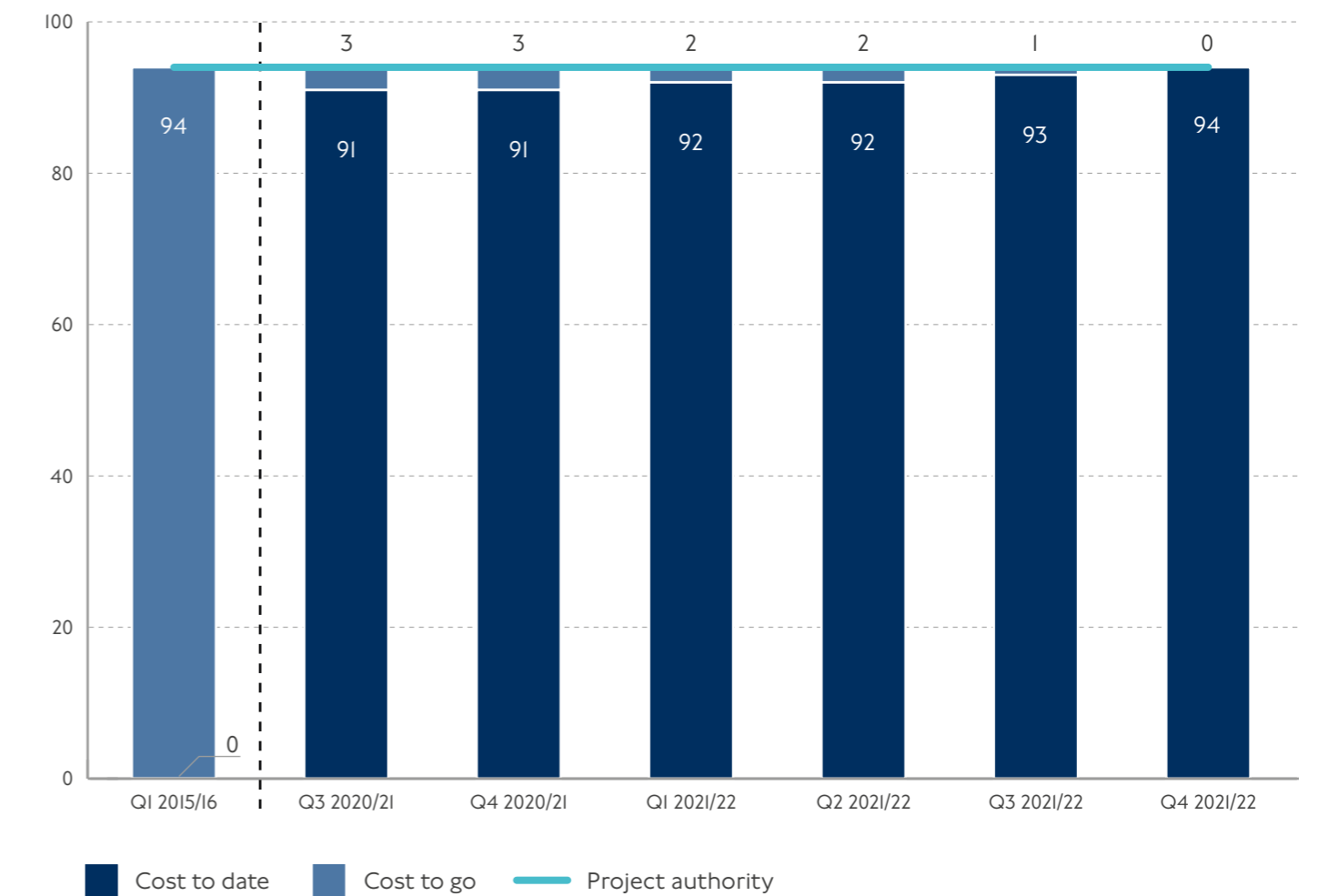
This programme involves upgrading surface stations on what will form the Elizabeth line route. It comprises step-free access work at seven stations and refurbishment work across the 22 surface stations that we operate.

As per the last update, focus on the On Network Station Improvement programme has been completing the last parts of the work being delivered by our station operator, MTR.

Physical work on the programme is now complete. In support of this we have already agreed a final account position on the main contracts and are working with MTR to close the project from a paperwork point of view.

Estimated final cost performance over time (£m)

Forecast completion date



All numbers are shown as net of income and third-party contributions. Figures are rounded to the nearest £m.

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)
Winter 2025	996	10	1,006	1,149	143
Change since last Investment programme report					
No change	3	(3)	No change	No change	

Performance over time

The forecast end date represents the delivery of Elizabeth line rolling stock and depot, including all additional changes. Since the authority award in 2013/14, our forecast end date has been delayed by approximately four years due to delays to the overall Crossrail programme.

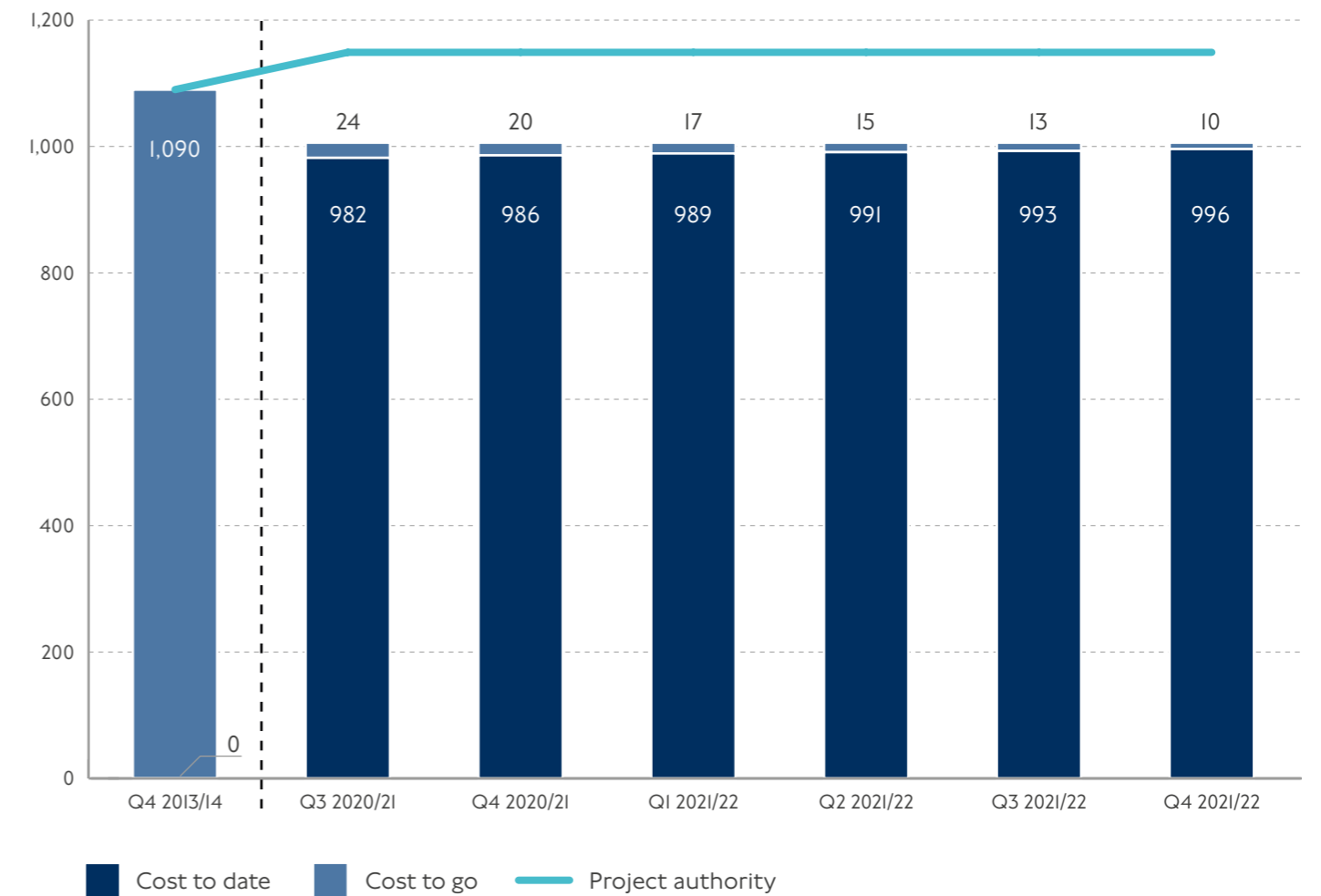
Our authority increased in 2018/19 when five additional units were added. Since the authority was awarded in 2013/14, the EFC has dropped from £1,090m to £1,006m. This is because the trains have subsequently been part of a sale and leaseback arrangement. These trains are now being leased from 345 Rail Leasing Limited on a 20-year lease agreement and the costs are being charged to operational costs.

Programme update

The Elizabeth line opened for service on 24 May. This ground-breaking project will transform travel across London and the southeast by dramatically improving transport links, cutting journey times, providing additional capacity and transforming accessibility, with spacious new stations and walk-through trains. It will initially operate as three separate railways, with services from Reading, Heathrow and Shenfield connecting with the central tunnels from autumn this year.

Estimated final cost performance over time (£m)

Forecast completion date



Passenger services between Reading and Paddington have been operating with a combination of nine-car and seven-car Class 345 trains, while the seven-car trains are progressively taken into Old Oak Common depot to be converted to nine-car trains. All seven-car trains have now been converted apart from three which will continue to serve the shorter platforms at Paddington mainline station until the start of stage five through-running services into the Elizabeth line central section later in 2022. Services to Heathrow, and between Liverpool Street and Shenfield, continue to be operated by nine-car Class 345 trains.

The line is operating 12 trains an hour (up to 18 Class 345 trains) between Paddington and Abbey Wood, Monday to Saturday from 06:30 to 23:00. It is anticipated that progressive incremental updates will continue to be made to the train and signalling systems beyond the start of service, and we have provided for this in the rolling stock project through to 2025.

Challenges

Fleet reliability has improved, but not to the level that was previously anticipated. A new suite of reliability-focused software is being installed on the fleet by the manufacturer, Alstom, which is expected to deliver a significant improvement.



The Elizabeth line has dramatically improved journey times

Crossrail

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Autumn 2023	15,609	354	15,963	15,789*	(174)
Change since last Investment programme report					
2 quarters	98	(98)	No change	No change	

Crossrail is the biggest railway infrastructure project in Europe and is one of the largest single investments undertaken in the UK.

Financial commentary

The forecast end date has moved out by approximately six months due to the risks associated with implementing auto-reverse, the additional functionality required for operational resilience, the reliability of rolling stock and infrastructure, and handover and assurance with Network Rail.

Performance over time

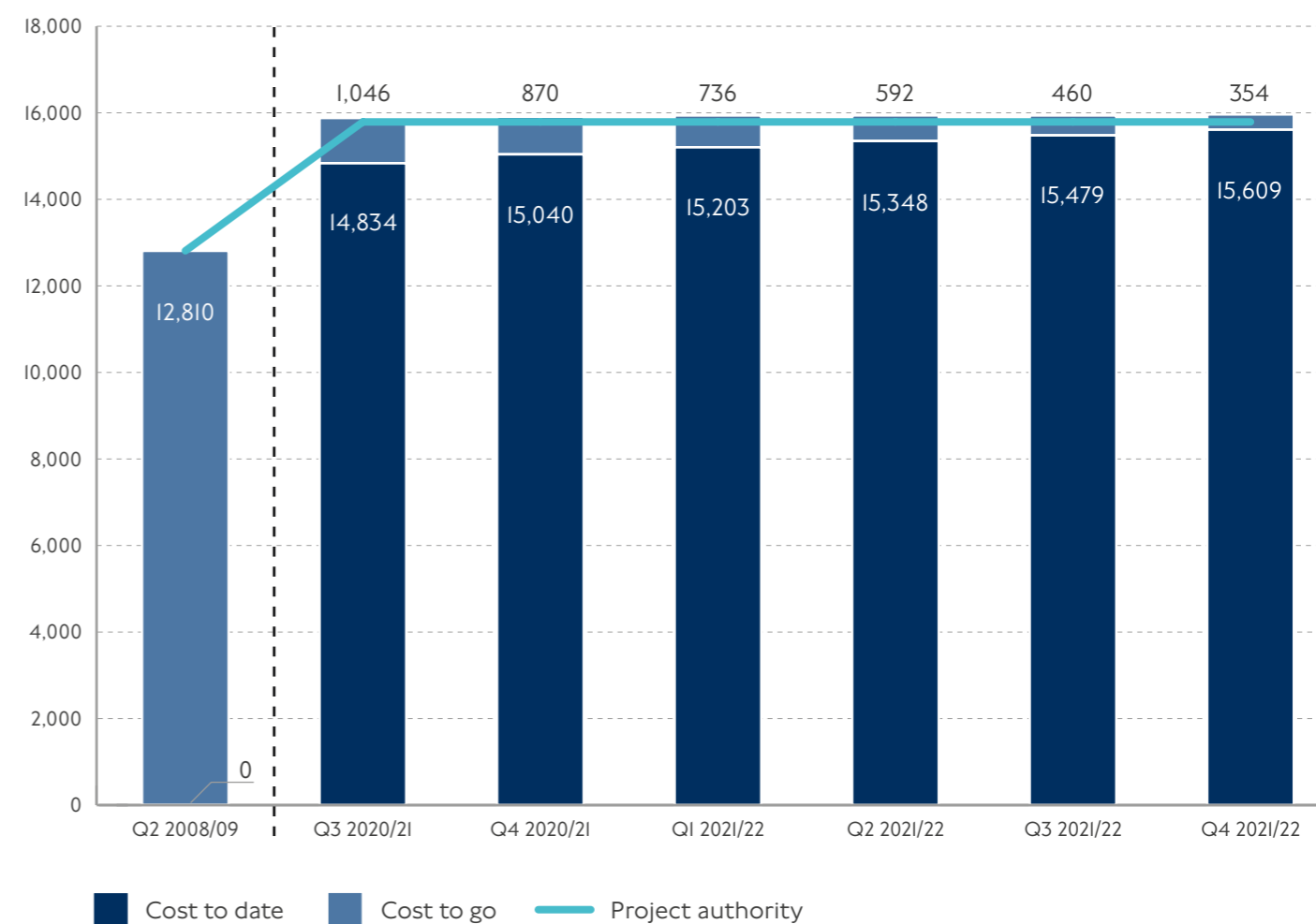
The reported forecast end date represents operation of a full service from Reading and Heathrow through the central section to Shenfield and Abbey Wood, with a peak service of 24 trains per hour.

The original forecast end date was autumn 2019. However, the schedule at the time assumed that installation of critical systems, construction of stations, and testing and commissioning could all be completed in parallel towards the latter stages of the programme, which ultimately was not achievable and led to a delay in completion. On top of this, the coronavirus pandemic had an impact on productivity in 2020, although this has been mitigated from a schedule and cost perspective.

Since setting Delivery Control Schedule 1.2 in August 2021, costs have remained largely stable due to active management of the EFC. The programme has been able to realise a number of opportunities and risk retirements over this period, however increasing cost pressures at Bond Street and Canary Wharf stations has meant there has been no favourable movement overall in the EFC.

Estimated final cost performance over time (£m)

Forecast completion date



* Excludes on-network works carried out by Network Rail

Programme update

The transformational Elizabeth line opened on 24 May 2022 to an incredible reception from Londoners and transport enthusiasts around the world. Hundreds of thousands of customers used the railway on its first day of operation, taking advantage of the seamless journeys through the heart of London on the new central section. The Elizabeth line is a historic, once-in-a-generation addition to London's transport network that will not only change how people travel in London but will support the creation of new jobs and economic growth throughout the country.

This ground-breaking project will transform travel across London and the southeast by dramatically improving transport links, cutting journey times, providing additional capacity and transforming accessibility, with spacious new stations and walk-through trains. It will initially operate as three separate railways, with services from Reading, Heathrow and Shenfield connecting with the central tunnels from autumn this year.

It is currently operating 12 trains an hour between Paddington and Abbey Wood, Monday to Saturday from 06:30 to 23:00. Work will continue in engineering hours and on Sundays for a series of testing and software updates to take place in preparation for more intensive services from the autumn.

The celebratory response to the opening saw around 260,000 journeys made on the new central section between Paddington and Abbey Wood across its opening day, clearly showing its popularity. Across the whole line, which stretches from Reading and Heathrow in the west to Shenfield and Abbey Wood in the east, more than 460,000 journeys were made.

Customers travelled from all over the country and indeed the world to be part of the historic opening of the line, while Londoners showed their enthusiasm at stations across the capital hours before the opening. Huge lines of people queued for hours at a number of stations across the line before opening to ensure they were able to be among the first to use the inaugural trains on the Elizabeth line.

The enthusiasm for the Elizabeth line is clear, as is the transformational impact it will have on London. The railway has opened up new journey options, will support jobs and deliver a huge economic boost, not only for London but for the whole country. The increase in central London's rail capacity of 10 per cent is the largest single increase in decades and will support the capital's regeneration and recovery from the pandemic.



Central London's rail capacity has now increased by 10 per cent

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)
Autumn 2024	5,140	318	5,458	5,447	(11)
Change since last Investment programme report					
No change	30	(27)	3	No change	

Financial commentary

Following the revised authority, granted by the Programmes and Investment Committee in July 2021, the project manager expects the final signal migration area I4 to still be completed in autumn 2024.

The EFC has increased by £3m since the last report, this is principally due to procurement related delays for works at the Neasden Heavy Maintenance Facility and Thales contract inflation.

We are providing a full update at this July Programmes and Investment Committee meeting. As part of the full update, the software programme will be extensively analysed with our signalling contractor, Thales.

Performance over time

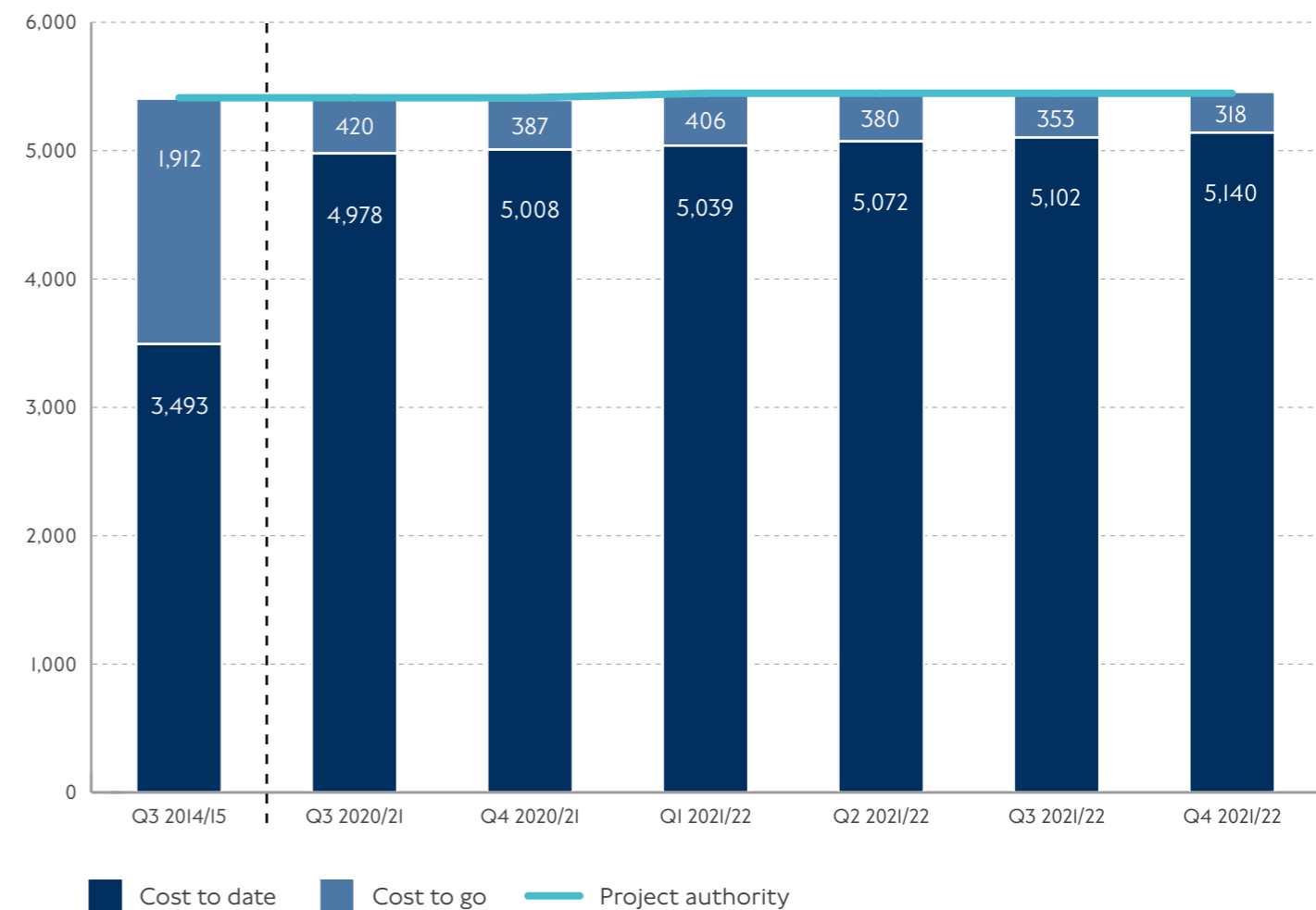
The forecast end date in the performance over time graph has been updated with historical data being restated since the last investment programme report. In previous reports, the commercial close out of our signalling contract was used as the completion date. The forecast end date now reflects when the final signal migration area I4, between Rayners Lane and Uxbridge, will be brought into service.

Recognising the change in reporting approach, since the award of the signalling contract in July 2015, our completion date has been delayed by 18 months. Delays are principally due to challenges with complex software development, testing and commissioning, closure availability and the impact of the coronavirus pandemic.

Our estimated final cost has remained relatively static over the same period while we develop our forecasts based on our understanding of the cost to go in relation to the remaining scope of work and the associated risks, which considers the entire programme.

Estimated final cost performance over time (£m)

Forecast completion date





Programme update

The section of signal migration area five, between Sloane Square, Paddington, Fulham Broadway and Barons Court, went live on 27 March 2022. This will enable a timetable improvement, making journeys on average five per cent quicker, to be implemented on the Circle and District lines between Monument, Fulham Broadway, Barons Court and Paddington (signal migration areas four and five) in September 2022. This was a major achievement for the programme as it involved upgrading the highly complex junction at Earl's Court and completed the implementation of communication-based train control across the entire Circle line.

Since commissioning the signalling upgrade, the underlying system performance has been good but a specific software issue, safely mitigated by operational restrictions, needed resolving and the software required an update. This diverted resources from the development and testing of software for the future migration areas. Mitigations are being developed and the overall schedule impact is being assessed. As a consequence, commissioning signal migration areas six and seven later this year at the eastern end of the District line is currently under review.

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)
Summer 2026	182	645	827	863	36
Change since last Investment programme report					
No change	37	(36)	1	No change	

Financial commentary

While our EFC is £36m under programme and project authority, since the last report it has increased by approximately £1m, mainly due to inflationary pressure on material costs. We are reviewing opportunities and mitigations to minimise the impact of this increase.

Performance over time

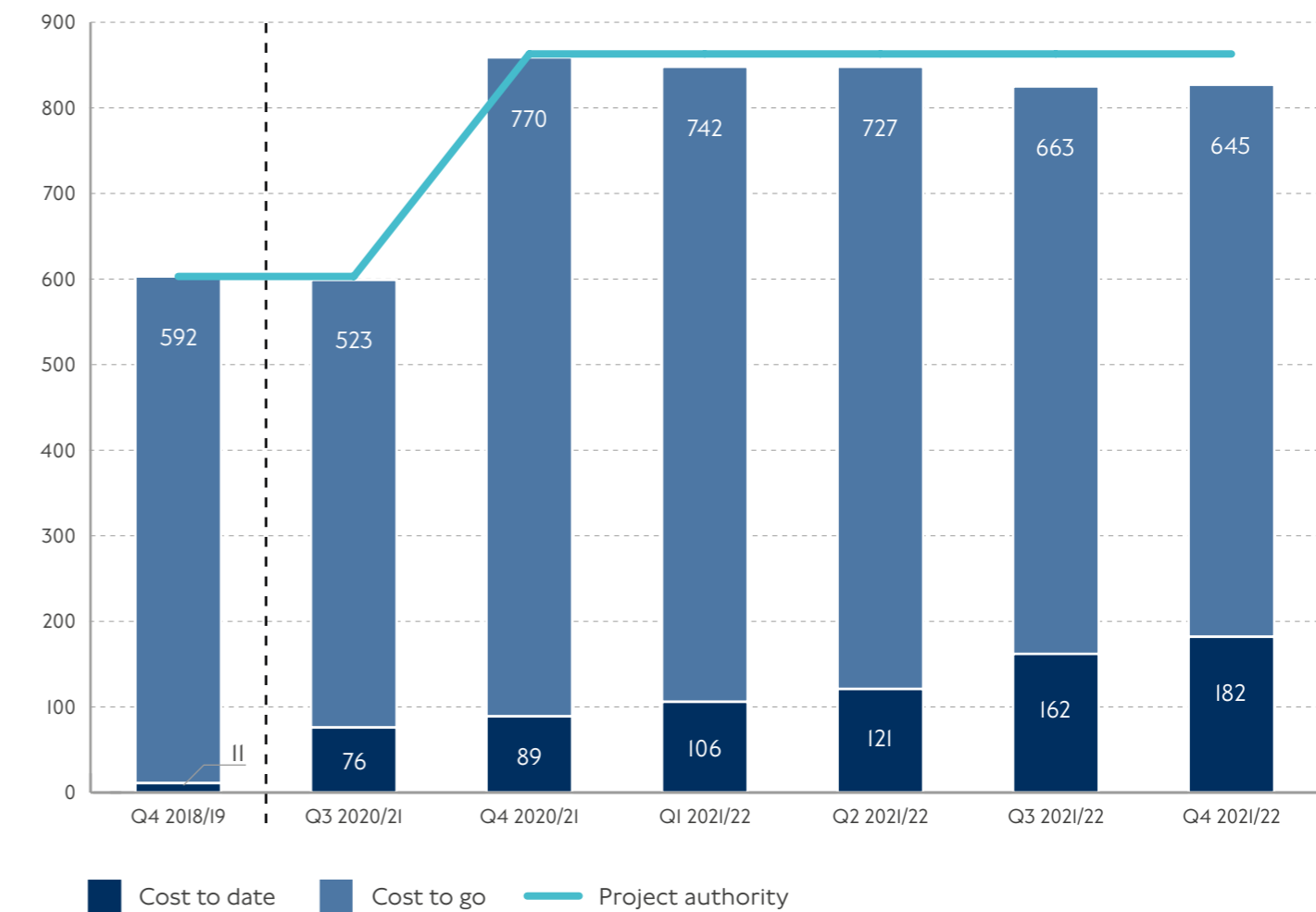
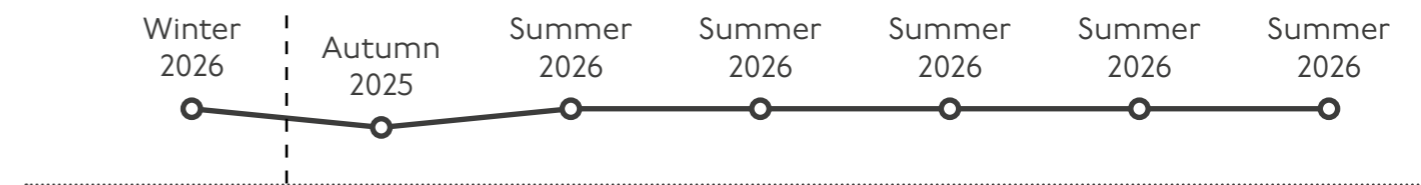
The forecast end date in the performance over time graph has been updated, with historic data being restated since the last Investment programme report. The forecast end date now reflects the final new DLR train being brought into service rather than the commercial close out of the contract.

Since the original grant of programme and project authority in 2019, we have increased our scope to include an extra 11 trains, which are being funded by the Department for Levelling Up, Housing and Communities, taking the total number to 54 new trains.

We reduced our estimated final cost to reflect procurement savings and by taking a proactive stance with the remaining risk exposure as the rolling stock design approaches completion.

Estimated final cost performance over time (£m)

Forecast completion date



Programme update

Rolling stock delivery

Dynamic testing of the new rolling stock is proceeding to plan on the manufacturer's test track in Spain.

Beckton depot and network infrastructure

Work on the northern sidings at Beckton has undergone an intensive period of track work to support the lead up to the changeover to the new signalling control system. In advance of the works, the sidings affected by the changeover have now been physically disconnected from the depot. Over the Easter weekend, we completed the changeover of the depot signalling from the old programme logic control system to the new operating system. This work involved commissioning all the existing signalling assets onto the new system and paves the way for the sidings works to continue.

Housing Infrastructure Funding

We have completed the acquisition of the land at Beckton next to the depot. This is needed for the construction of the additional sidings funded by the Housing Infrastructure Fund. The focus is now on the submission of the planning permission to allow works on the land to begin later in the year.



We are carrying out dynamic testing of new DLR rolling stock

Line upgrades

Piccadilly line upgrade

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Winter 2027	425	2,400	2,825	2,994	169
Change since last Investment programme report					
1 quarter earlier	42	(59)	(17)	No change	

Financial commentary

Our EFC has decreased by £17m since the last report, owing to procurement efficiencies. Our risks and opportunities are being actively managed each period, which results in changes to the EFC. Our forecast completion has improved from spring 2027 (April to June 2027) to winter 2027 (January to March 2027). This was achieved by performing an in-depth review of the critical path to completion and driving schedule efficiency.

Performance over time

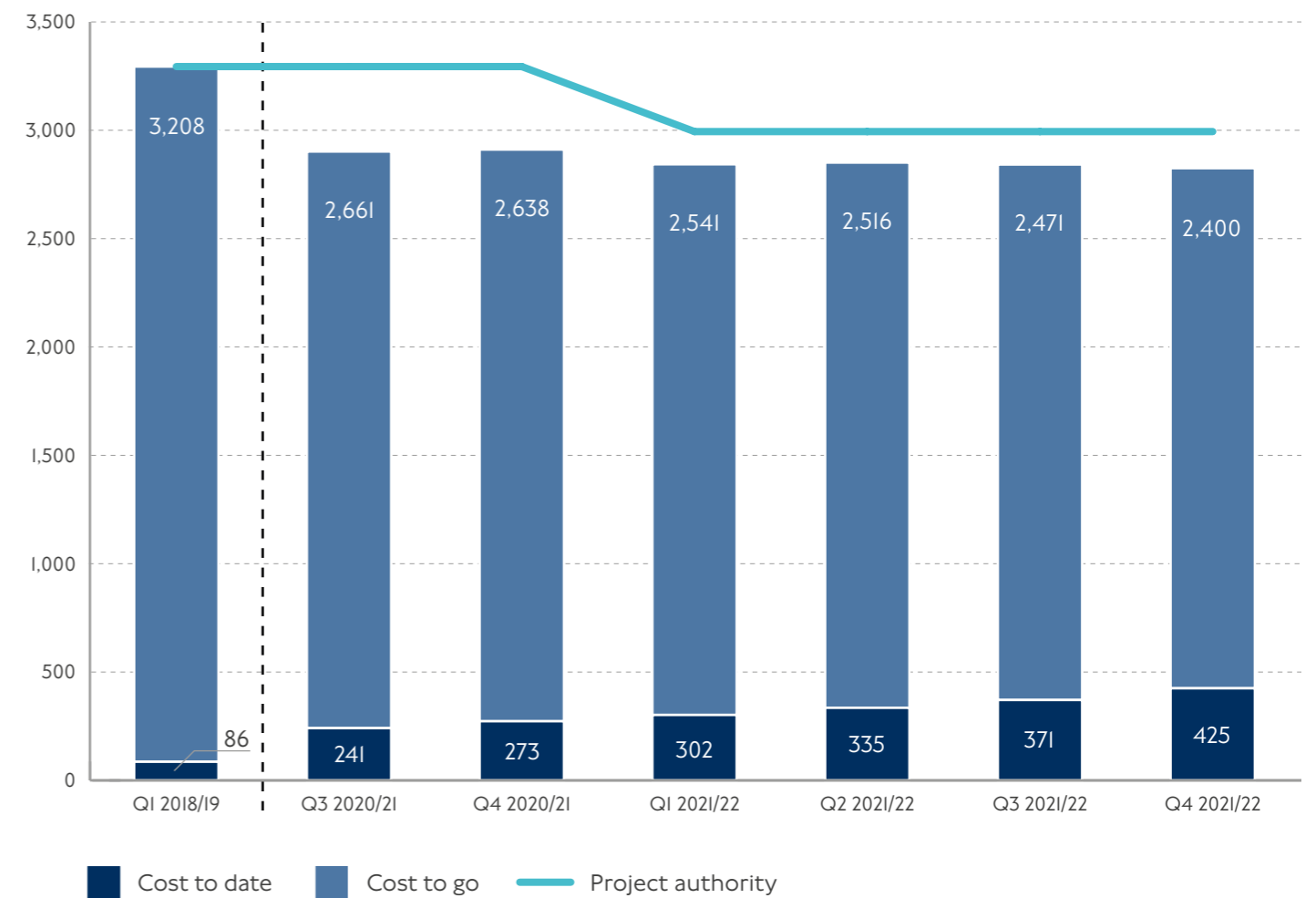
The forecast end date represents the date when the new Piccadilly line trains and all supporting infrastructure is in use. Since authority was originally awarded in

May 2018, our forecast end date has been delayed from 2026 to 2027. This was driven by a decision to defer the start of third party spend where possible by six months to help mitigate funding challenges due to the pandemic. As a result of an in-depth review of the critical path activities and driving schedule efficiency, the forecast completion has been brought forward from spring 2027 to winter 2027. The new trains are now expected to begin entering revenue service from summer 2025.

Despite the impact of the pandemic, we have reduced our overall EFC through the realisation of opportunities, an ongoing focus on value and efficiency, and reduced contract costs.

Estimated final cost performance over time (£m)

Forecast completion date





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The delivery of the new Piccadilly line trains is ahead of schedule

Programme update

Power

All bidders for the high voltage power framework have been notified of the results. The ten-day mandatory stand-still period, prior to the award, has been completed and the successful and unsuccessful bidders have been notified.

Delivery fleet introduction

The Mayor and Chief Capital Officer visited Goole in March accompanied by a group of journalists. The visit provided an opportunity to showcase the new Piccadilly line upgrade trains via the cab and saloon mock-ups both now located in Goole, as well as highlighting that investment in London supports jobs and growth throughout the UK.

Manufacture of the new trains continues as planned and included testing the robotic painting machine.

Depots and stabling

We now have a revised programme for South Harrow sidings with the first four roads due to be commissioned in early July and the remaining eight roads to follow in winter 2022.

Network extensions

Northern Line Extension

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
September 2021	1,098	9	1,107	1,260	153
Change since last Investment programme report					
No change	3	(3)	No change	No change	

Financial commentary

The EFC has remained stable and the variance on spend to date and cost to go reflects the costs that have been spent since the last report.

Performance over time

The project is expected to come in £153m under budget, bringing its EFC to £1.1bn, despite the cost pressures brought about by the pandemic.

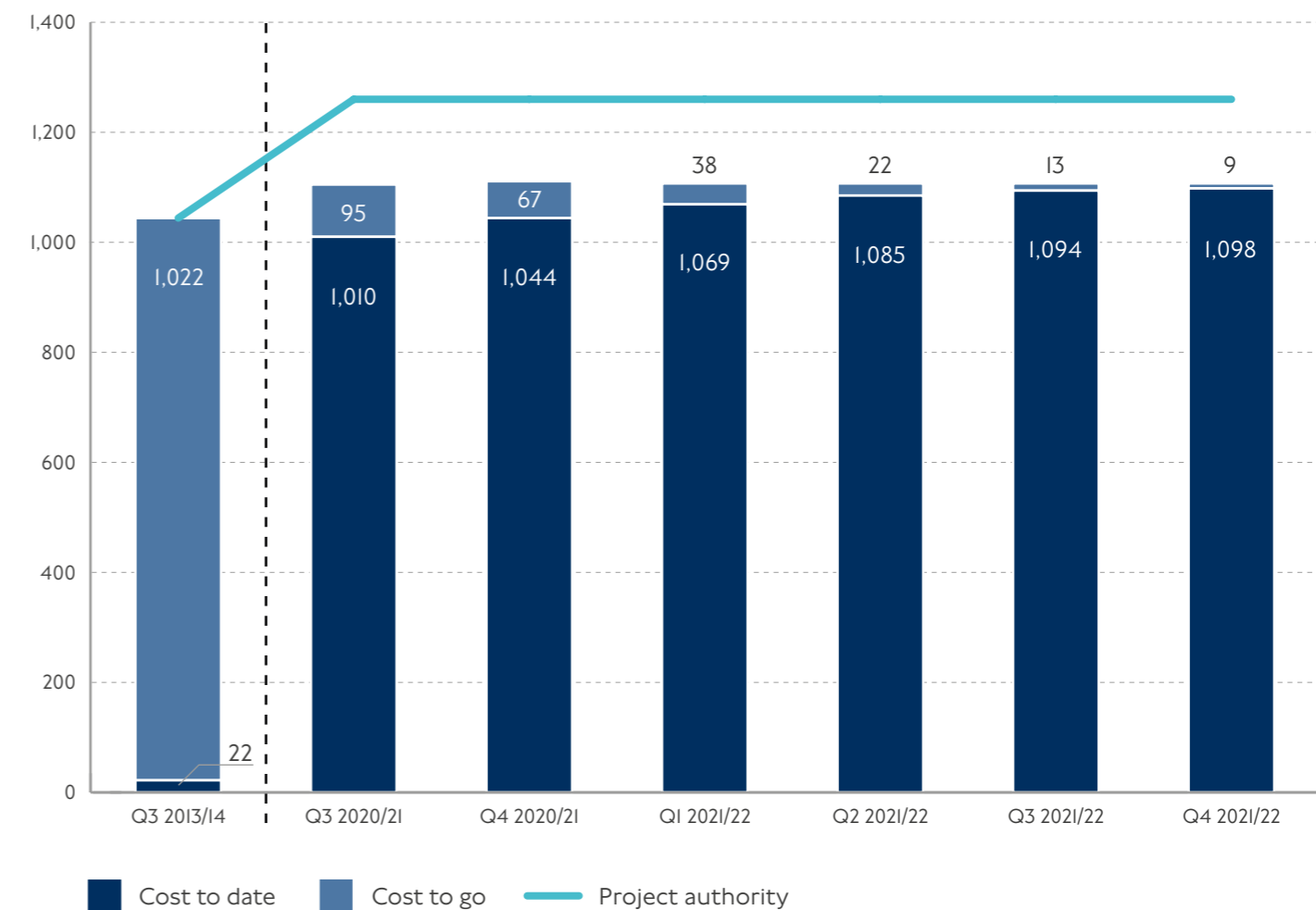
Programme update

The extension has operated successfully since it opened in September 2021. Up to 12 March 2022, approximately 2.14 million trips have been recorded, with an average of 30,000 passengers per week at Nine Elms and 60,000 passengers per week at Battersea Power Station.

The team is now focused on closing out snagging items, completing assurance documentation and achieving commercial closure.

Estimated final cost performance over time (£m)

Forecast completion date



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)
Spring 2025	69	111	180	173	(7)
Change since last Investment programme report					
I quarter later	4	(4)	No change	No change	

Financial commentary

The EFC is currently £7m over the delegated programme and project authority of £173m. The project team continues to seek opportunities to bring this back in line with authority. The main change in EFC since the last report is due to an increase in our risk exposure, which we are looking to mitigate, and an increase in group finance inflation assumptions.

Performance over time

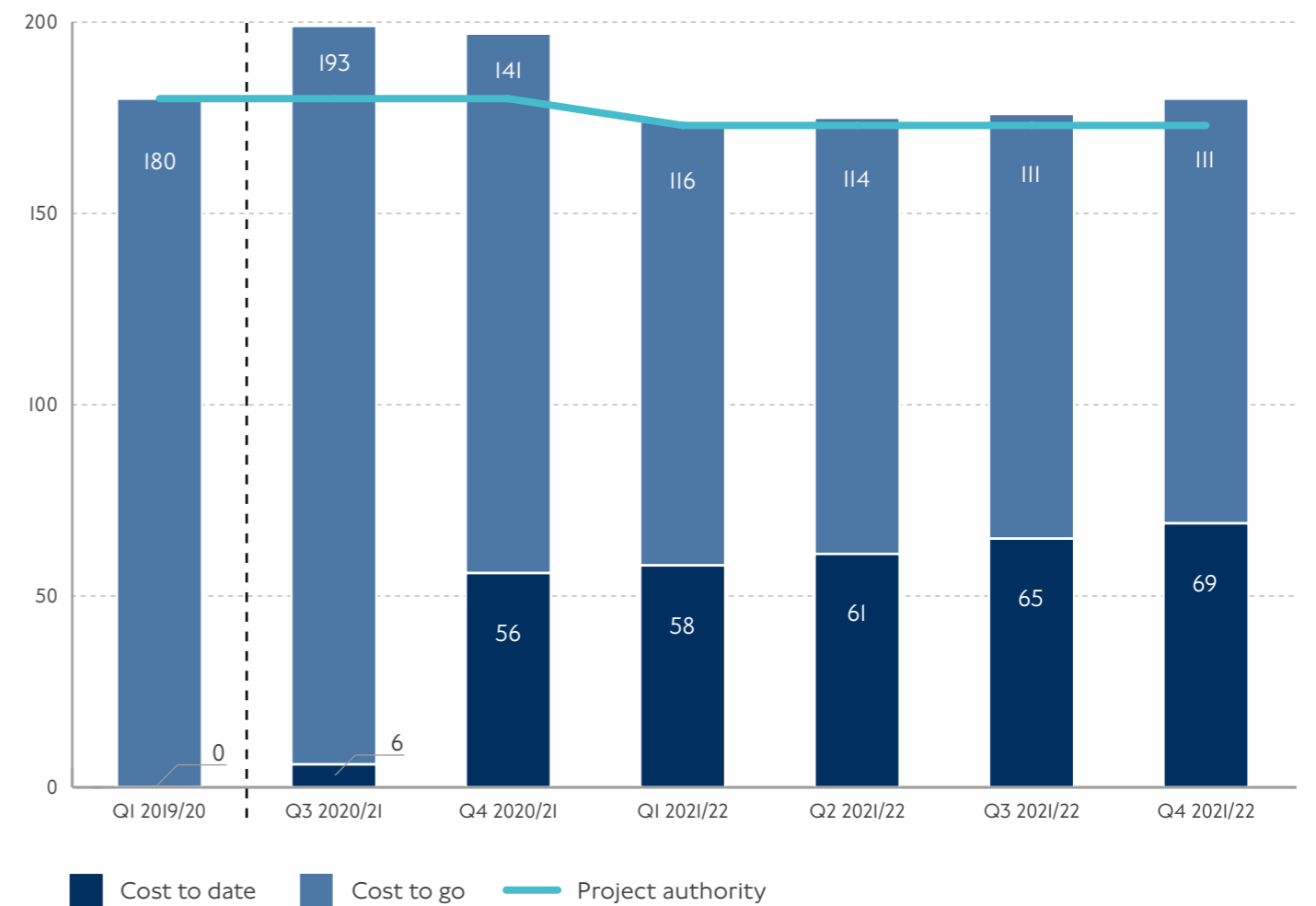
The forecast end date is when we obtain the permit to use the new Silvertown Tunnel from an independent assessor.

Our forecast end date has been relatively stable since the programme and project authority was approved in May 2019. Since the last report, however, we have seen a movement of 19 days in the permit to use date, moving from mid-March to the beginning of April 2025.

Our EFC increased to include additional costs for implementation of Road User Charging infrastructure. It was reduced in Quarter I 2021/22 after this scope and budget was transferred to the Road User Charging portfolio within surface programme and project delivery to achieve synergies with our other Road User Charging schemes.

Estimated final cost performance over time (£m)

Forecast completion date



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

Programme update

We have now taken temporary possession of much of the required land from existing tenants to enable handover of 59 out of 71 sites to our contractor Riverlinx.

Good progress continued on site, including significant piling operations and excavation works to construct the tunnel boring machine launch, rotation and retrieval chambers. The main components of the tunnel boring machine have arrived on site and are currently being assembled in advance of being used in summer 2022.

Other significant works include the completion of the replacement river wall on the north bank of the Thames to ensure its stability during our tunnelling works. This will also provide additional habitat and future-proofed flood defences to support wider development plans in the area.

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



Construction work on the Silvertown Tunnel is progressing well

Network extensions

Barking Riverside Extension

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Summer 2022	318	8	326	329	3
Change since last Investment programme report					
1 quarter later	7	(12)	(5)	No change	

Financial commentary

The EFC has reduced by approximately £5m since the last report and is the result of several savings. These include the transfer of the remaining urban realm works to the Barking Riverside developer (to fulfil our planning obligations), the closure of construction risks as the project enters the testing and commission phase, and a reassessment of the ranges of the remaining commercial issues. While the project EFC currently remains below authority, an emerging issue around signal positioning and the remedial option may impact the current EFC.

Service operation between Gospel Oak and Barking Riverside is expected to begin in summer 2022, which is an improvement from autumn, as previously reported.

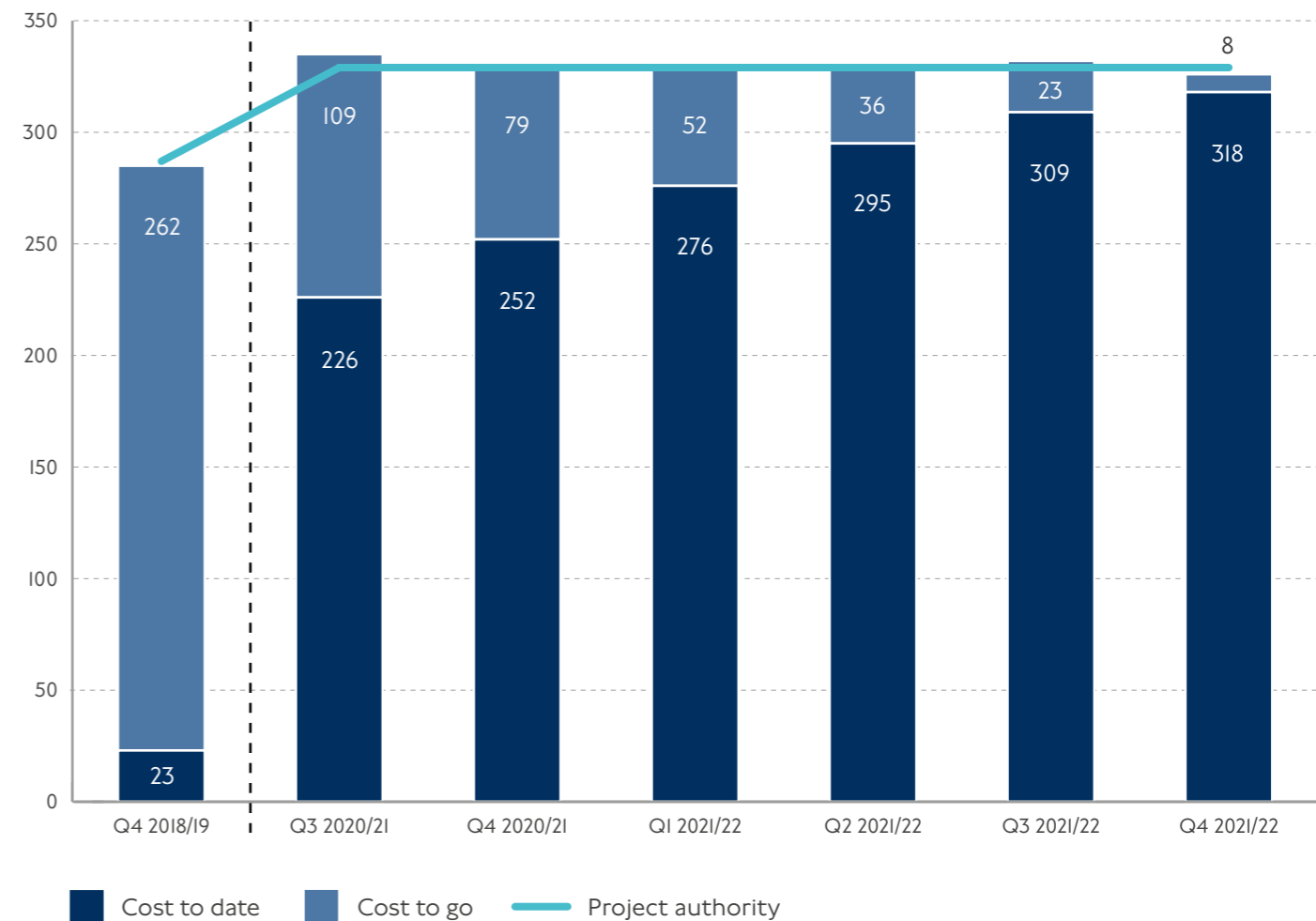
The revised date is based on our latest programme assessments, which includes more detailed information around the station urban realm works, assurance requirements and alignment with London Overground timetable changes.

Performance over time

Our forecast end date, when service will run between Gospel Oak and Barking Riverside, has been delayed since the programme and project authority was approved in 2018, following the discovery of uncharted utilities and the Safe Stop, because of the pandemic. The Safe Stop resulted in the rail systems works being replanned and Network Rail possessions rebooked, with only two opportunities in a year for a four-day possession. These events have also increased our EFC.

Estimated final cost performance over time (£m)

Forecast completion date





Programme update

Delivery of the physical works is now substantially complete with testing and commissioning of the station entering its final stages. The final signal commissioning was completed in early April, and during the final track possession at the end of April, we commissioned the overhead line electrification. The public areas around the station are on track to be completed before service begins.

As the station and rail systems testing comes to an end, the focus is on preparing the assurance documentation which will be submitted to Network Rail and Office of Rail and Road to obtain authorisation to operate the service. Quality documentation and operation and maintenance manuals required to support the submission are being progressed with the main contractor. Our most likely date to begin passenger service operations is summer 2022.

In January, Network Rail notified us of a reporting signal sighting issue with two signals that we installed, and we have been working closely with Network Rail and the train and freight operators to find a solution. On 13 April, a temporary solution was agreed to enable trial operations and passenger trains to run, enabling revenue service to start in the coming months.

Major station upgrades

Bank station capacity upgrade

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Autumn 2022	637	65	702	702	0
Change since last Investment programme report					
No change	23	(23)	No change	No change	

Financial commentary

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

Performance over time

The forecast end date represents the opening of the new ticket hall at Bank station.

Our estimated final cost has increased since the authority award in 2016, owing to site works being disrupted by the impact of the terrorist attack at London Bridge, the need for additional scope following the discovery of asbestos, and the impact of the pandemic. Despite these challenges, our forecast end date has remained consistent.

Programme update

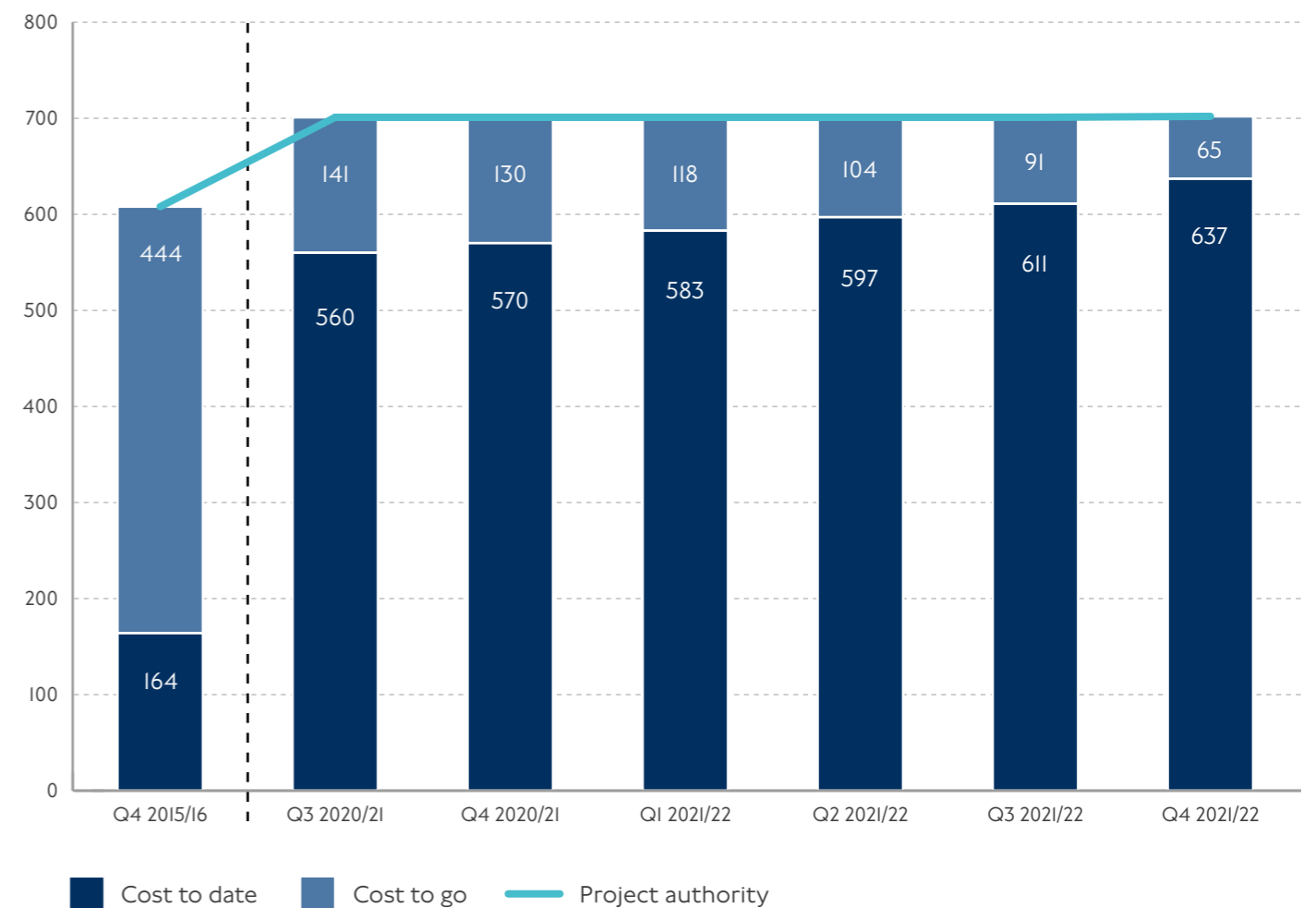
The Bank branch of the Northern line re-opened to schedule on 16 May, following a 17-week planned closure. During the closure, we constructed a new, wider southbound Northern line platform and spacious new customer concourse. There are three new passageways, which will make moving around the station quicker and easier for customers.

The next phase of works is on the key interchange connections, including the new escalators linking the Northern line to the DLR, and the two new moving walkways and three new escalators connecting the Central and Northern lines. The works will culminate in a new station entrance at Cannon Street.

These improvements are all part of the wider Bank station capacity upgrade programme which is due to complete later this year.

Estimated final cost performance over time (£m)

Forecast completion date



Elephant & Castle

Forecast completion	Gross cost to date (£m)	Gross cost to go (£m)	Gross EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Winter 2028	9	72	81	81	(0)
Change since last Investment programme report					
No change	2	(2)	No change	No change	

Financial commentary

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

Performance over time

The progress made by the forecast completion date has been revised since the last report, and now includes completing the station tunnelling works.

Completion dates and cost forecasts have remained stable since authority for tunnelling works and station box construction was approved by the Programmes and Investment Committee in December 2021.

Programme update

Since the development agreement in December 2021, a complex package of stage one early enabling works has been successfully delivered and allowed us to take advantage of the Northern line Bank closure to minimise costs and the risk of disruption. These works included relocating

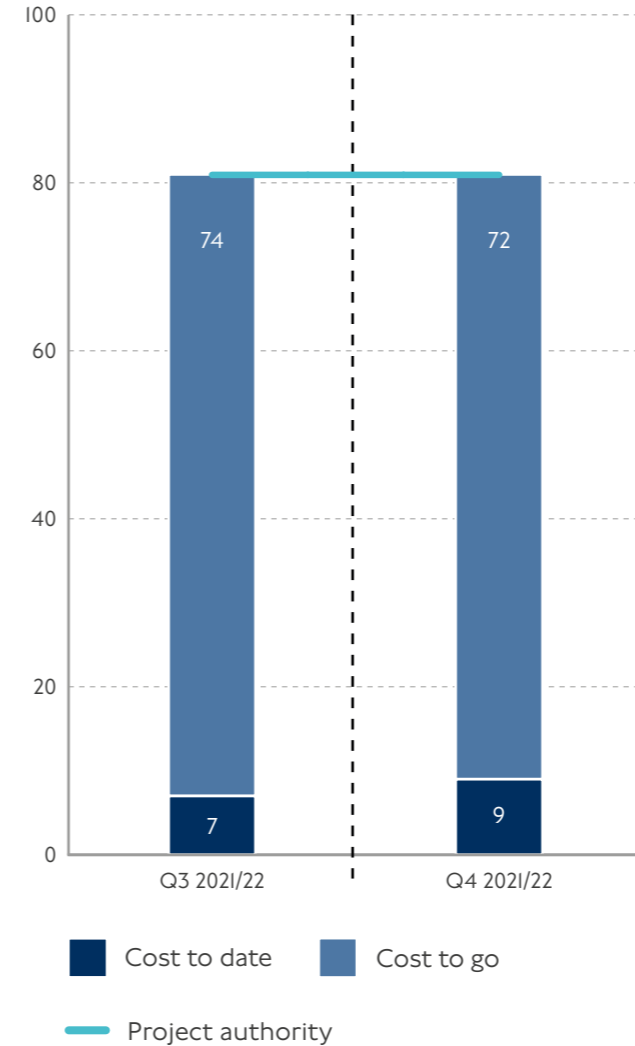
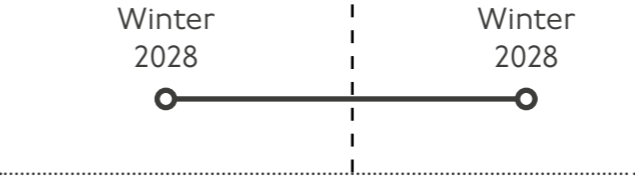
assets stored in platform rooms on both Northern line platforms, repurposing the disused pedestrian subway on the station peninsula, the installation of ducting to carry new utilities connections for the upgraded station, surveys of the tunnels at future breakthrough locations, as well as the removal of hazardous materials.

We have significantly removed this complex activity from the tunnelling contract by carrying out these works early, and this has also enabled the team to improve their safety routine. The works have notably had no incidents.

We are now moving ahead in our preparations to secure our procurement strategy, and have issued a prior information notice for the tunnelling works. This was supported by an industry day which took place on 27 May 2022. It was very well received by the suppliers and approximately 70 people attended. A press release accompanied the prior information notice, which was also positively received.

Estimated final cost performance over time (£m)

Forecast completion date



High Speed 2

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Summer 2035	23	40	63	28	(35)
Change since last Investment programme report					
No change	3	(2)	1	No change	

Financial commentary

Programme and project authority is £35m lower than EFC, as it is granted on an annual basis for the following year's spend. All costs are fully reimbursable from the third-party High Speed 2 (HS2) project.

Performance over time

The reported forecast end date has been changed since the last report and now reflects completion of works at Euston.

This programme comprises new TfL assets, infrastructure and operational facilities at Euston and Old Oak Common to interface with the new railway.

Since this programme was included in our Major projects portfolio in 2019, forecast costs have increased due to increased scope instructed by HS2. Note that, currently, the forecast completion date for the works is under review as part of the Oakervee Review and the associated baseline review. Programme and project authority has been granted on an annual basis for the spend in the following year.

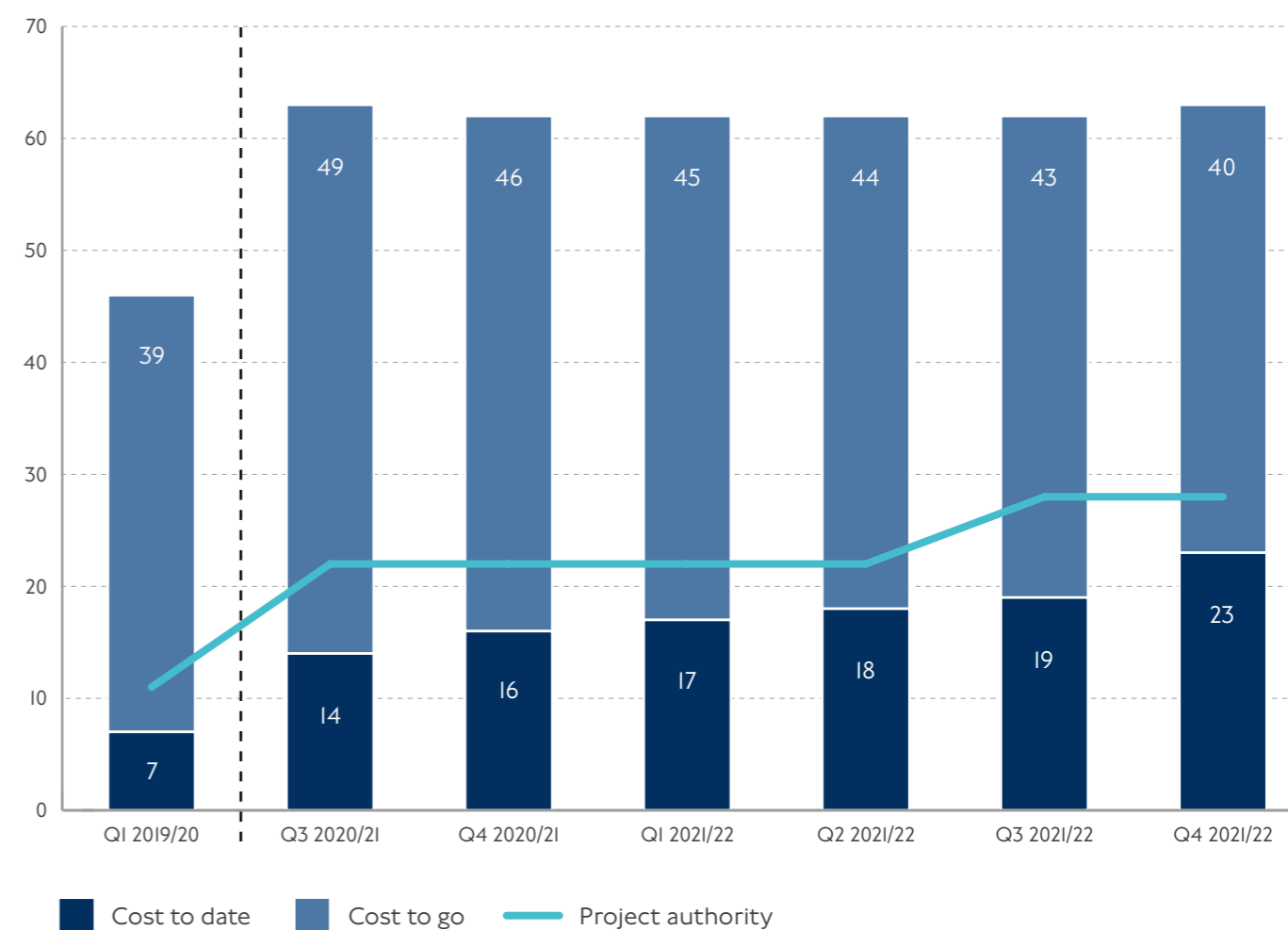
Programme update

At Euston, construction work continues across the campus and to the north of the Hampstead Road for the tunnelling portals and approach tracks. A milestone was reached last year when HS2 achieved a breakthrough at each end of the tunnels connecting the site of the new Northern line substation with the existing substation. HS2 construction is ongoing at this location, and the new traction substation will be handed over to us when complete.

The design of our new infrastructure at Euston continues together with the campus master planning, integrating with the new design for the upgrade of the existing Network Rail station at Euston. We are working with all stakeholders to ensure our services, including any required interim relocation of the bus station, are adequately provided to meet the needs of the travelling public. At Old Oak Common, HS2 works continue at pace on the construction of the new station box.

Estimated final cost performance over time (£m)

Forecast completion date



Railway systems enhancements

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)
2018/19 to 2028/29	143	20	163	171	8
Change since last Investment programme report					
No change	1	0	1	No change	

Financial commentary

The forecast cost and the programme and project authority have decreased since the last report. The most significant reduction is due to the decision to defer the enhanced signalling for the Jubilee line and fleet improvements.

Performance over time

For the reporting period from 2018/19 to 2028/29.

Our costs and authority both reduced in Quarter 4 2021/22 driven by the decision to defer the enhanced signalling for the Jubilee line and fleet improvements due to funding challenges in the wake of the pandemic.

Programme update

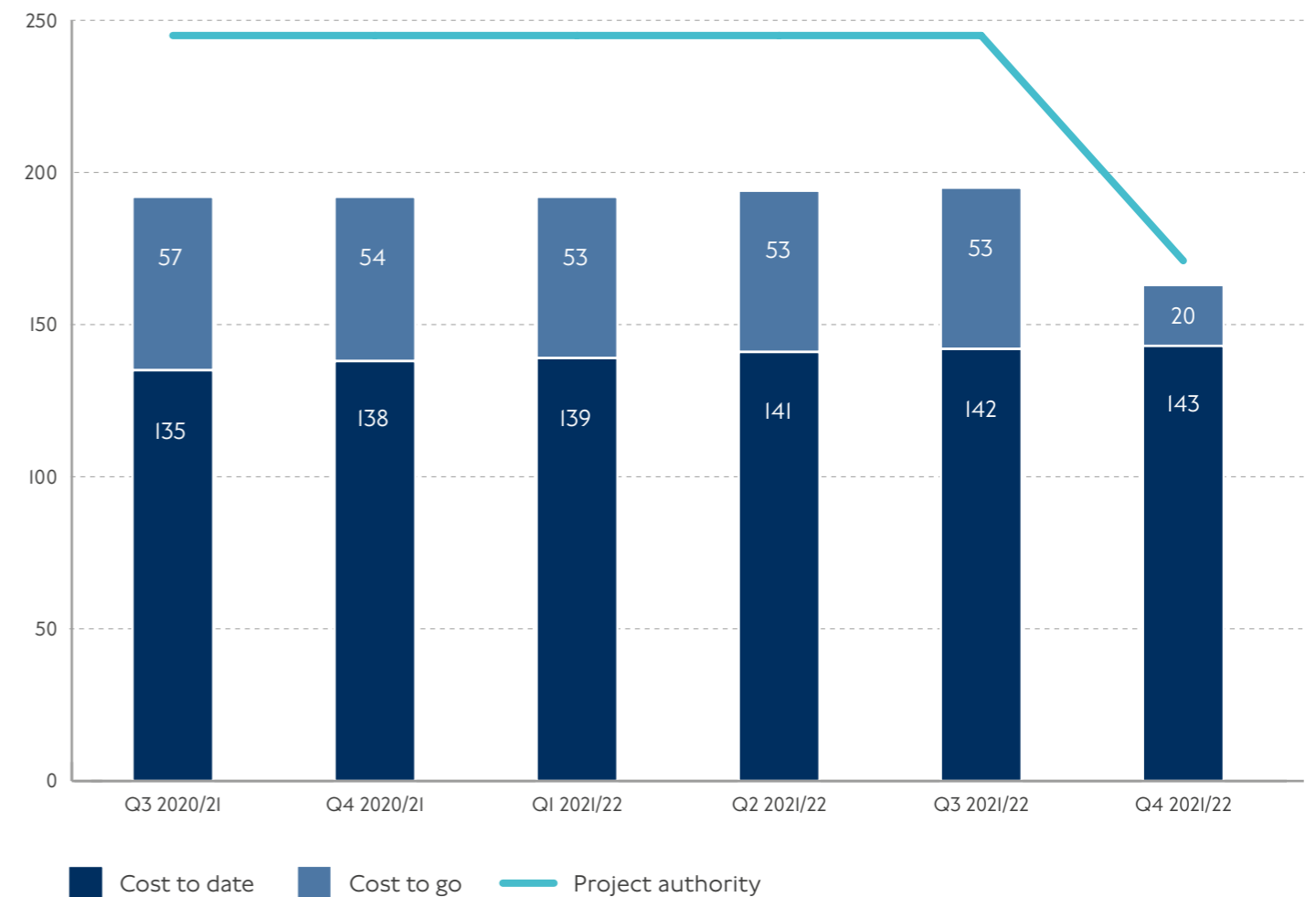
Planning continues for the delivery of Northern line signalling software updates targeted for commissioning on the railway in late 2022. This includes the software changes required at the end of the Bank closure in May 2022.

The enhancement work for the Northern line power supply continues and is due to be completed in early 2022. This will provide system capacity and resilience for reliable services during planned or unplanned outages.

The rolling stock works to enable an increase in entry and exit speeds at Neasden depot are on target for completion in spring 2022. This will support Metropolitan line service uplifts.

Following approval at the Programmes and Investment Committee, the Jubilee line enhanced signalling and fleet improvements, which will enable peak service of 32 trains per hour, has been deferred. Further signalling software updates on the Jubilee line are currently under the initial planning stages.

Estimated final cost performance over time (£m)



London Underground

Our programmes ensure safety and reliability, while also delivering accessibility enhancements and increasing station capacity. This portfolio is made up of stations, track, accessibility, rolling stock and systems renewals, signalling, buildings and technology investments



Enhancements

Station developments

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2016/17 to 2022/23	416	122	538	532	(6)
Change since last Investment programme report					
No change	4	(4)	No change	No change	

Financial commentary

Our forecast cost remains under review in light of funding constraints and will be updated to reflect the managed decline scenario in the new financial year.

Performance over time

Spend in the quarter continued at a steady pace as some projects reached completion, including the new ticket hall and interchange at Tottenham Hale, and work continued on the new entrance and step-free access at Knightsbridge.

Programme update

The enhancements programme covers a range of improvement projects, mainly on stations and depots. We improve stations primarily through enhancing accessibility, relieving congestion, and carrying out large scale capacity upgrades.

Tottenham Hale

The major redevelopment works at Tottenham Hale, which include a new landmark building housing an integrated ticket hall providing seamless step-free

interchange with National Rail, were successfully brought into customer service on 13 December 2021. All remaining snagging work is scheduled to be completed this summer.

Paddington

At Paddington, the successful completion of the main tunnelling drive to create a new cross-passage and changes to the evacuation routing in the station has enabled good progress on surface and ticket hall-level works on a co-funded scheme with Great Western Developments. The project is on target for delivery of the enhanced station in early 2023.

Colindale

We have completed the detailed design and early contractor involvement phase for an enlarged ticket hall at Colindale, with increased gateline capacity and step-free access. This has provided greater confidence in costs, schedule and construction readiness ahead of a future decision on contractual commitment to progress into construction delivery.

Discussions are ongoing with the London Borough of Barnet on potential ways forward if sufficient funding is not available to implement the current scheme.

King's Cross St Pancras

Negotiations continue on a developer-funded scheme to upgrade the station entrances on the south side of Euston Road as part of a wider redevelopment of the area. The delivery timescales for the project are still to be confirmed.

Knightsbridge

Following the delay caused by a supply chain insolvency in the past two quarters, programme-critical works related to providing step-free access at Knightsbridge have now been awarded to a new supplier, meaning works can be re-programmed. Completion of the Hooper's Court step-free entrance is now scheduled for summer 2023. The resultant costs from the delay, and the engagement of a new supplier have been offset by successful risk mitigation.

Leyton

We continue to work closely with our key stakeholder, the London Borough of Waltham Forest, to develop a new ticket hall, increasing capacity and providing step-free access. This is at an early design stage and will be subject to a review of available funding and a commercial agreement with the borough later this year. The timing of this depends on wider discussions about our financial position, as we are currently not able to commit to this project beyond the current design stage.

London Bridge

We are working with a third-party developer, who is proposing to open a new Borough High Street entrance to London Bridge Tube station. This would result in reduced journey times and congestion at street level, especially on Borough High Street itself. Discussions are ongoing with key internal and external stakeholders with the draft heads of terms for a future development agreement progressing well with the developer.

Notting Hill Gate

We are working with a third-party developer with planning consent to redevelop land next to Notting Hill Gate station and will be installing lifts from street to ticket hall level as well as to one of the Circle and District line platforms. This would result in step-free access being provided to this platform and stair-free access to the Central line platforms. Negotiations to formalise the contractual and property arrangements have been suspended following a recent announcement that the site has been sold to another developer.

South Kensington

With our joint venture partner Native Land, we are disappointed that the Royal Borough of Kensington and Chelsea did not grant permission for our plans to restore and enhance South Kensington station and surrounding streets, which includes providing step-free access to the Circle and District line platforms. We are currently reviewing all our options and continuing discussions with the Royal Borough of Kensington and Chelsea.

West Ham

We are working with the developer Berkeley Homes on a new ticket hall to serve the TwelveTrees Park housing development at West Ham. The main construction works associated with the new station entrance have begun on site and are progressing well, following the completion of the detailed design and successful enabling works, that were completed last year.

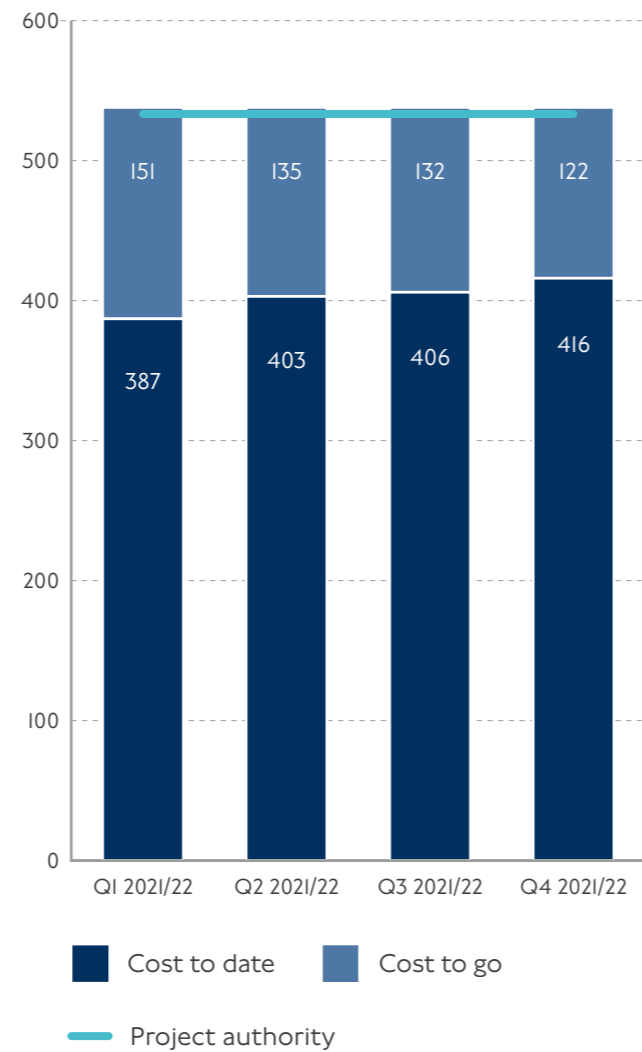
Waterloo

As part of a wider redevelopment at Waterloo that will see Elizabeth House demolished, we are developing a project to provide step-free access to the Northern line platforms. Discussions with the developer are ongoing and the programme is yet to be confirmed. The lift shaft would be constructed by the developer, however, the fit out of the shaft would be subject to affordability and availability of funding from us in the future.

Stratford

A new southwestern station entrance is programmed to open at Stratford regional station in early 2024. It is a collaborative venture with the London Legacy Development Corporation, London Borough of Newham and the Greater London Authority (GLA), who are fully funding the capital works. Concept design is now complete and subject to release of third-party funding. The detailed design and early contractor involvement phase of the project will begin in the spring.

Estimated final cost performance over time (£m)



Our plans for improvements at Stratford station are progressing

Enhancements

Depot construction

The project team is continuing to work closely with maintenance and operational teams in the delivery of these important strategic projects.

Acton train modification unit

The new state-of-the-art facility at Acton that enables the heavy overhauls and modernisation of Central line trains as part of the Central Line Improvement Programme has been in operation since handover last year. The project's close down phase concluded in the spring. This valued asset in our estate will support future London Underground fleet renewal programmes for many years to come.

Acton warehouse

Works at the Acton warehouse are progressing well with most of the essential clearance works completed. This has been a complex and challenging operation to decontaminate and safely remove the existing warehouse contents and then make the building safe to enable the essential surveys to progress ahead of full demolition. The completion of the surveys will inform and facilitate the next phase of detailed design, which will focus on the construction of a renewed storage facility. Discussions are ongoing to ensure the project meets the strategy for the future use of the Acton depot and the relocation of business activity from Lillie Bridge depot and Ruislip redevelopments.

Enhancements

Energy and cooling

Substation ventilation

Work continues on upgrading substations to modernise the Circle, District, Hammersmith & City and Metropolitan lines.

Works at Acton have now been completed and brought into use. Works at Embankment are complete and were commissioned and brought into use in May. Progress is being made across the remaining seven sites, with preparations being made to tender the remaining two sites, Barons Court and Bouverie Place.

Waste heat and private wire

Continuing uncertainty over our funding deal with Government has resulted in both the waste heat and solar private wire projects being paused. It is hoped that if funding is made available, then both projects will restart. The projects were paused at the end of the financial year.

The successful delivery of the waste heat project will see the reuse of heat from London Underground vent shafts. The Tube produces 500 gigawatt hours of waste heat per year, of which 10 per cent or 50 gigawatt hours is available for reuse. Six ventilation shafts are under consideration, with a view to serving thousands of residential and commercial premises and public buildings such as schools. The aim is to reduce the need for gas combustion and improve air quality by decreasing carbon emissions.

The solar private wire project focuses on direct connection to new-build solar photovoltaic generation. Based on a typical solar generation profile, the opportunity represents up to 64 megawatts of renewable generation, equivalent to five per cent of our annual energy load. Over a 15 to 25-year contract, by purchasing the energy and importing it onto the network, approximately 62,000 tonnes of carbon saving could be achieved.

Enhancements: Accessibility

Step-free access

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
Spring 2023	109	11	120	120	0
Change since last Investment programme report					
No change	4	(4)	No change	No change	

Financial commentary

Spend to date includes completing 12 step-free stations including the latest one, Harrow-on-the-Hill. The forecast EFC includes the last three remaining stations which are currently paused in light of funding constraints and will be updated in the new financial year.

Performance over time

Since authority award in June 2017, our forecast cost and authority have reduced to reflect reprioritisation due to affordability, from 28 stations to 15 stations. The forecast end date has been delayed by ongoing funding challenges and the Safe Stop of works during the coronavirus pandemic.

Programme update

Since 2018, we have introduced step-free access at Newbury Park, Buckhurst Hill, South Woodford, Mill Hill East, Cockfosters, Amersham, Debden, Ickenham, Wimbledon Park, Osterley, Sudbury Hill, and, most recently, Harrow-on-the-Hill, which became the 91st step-free Tube station on 8 March.

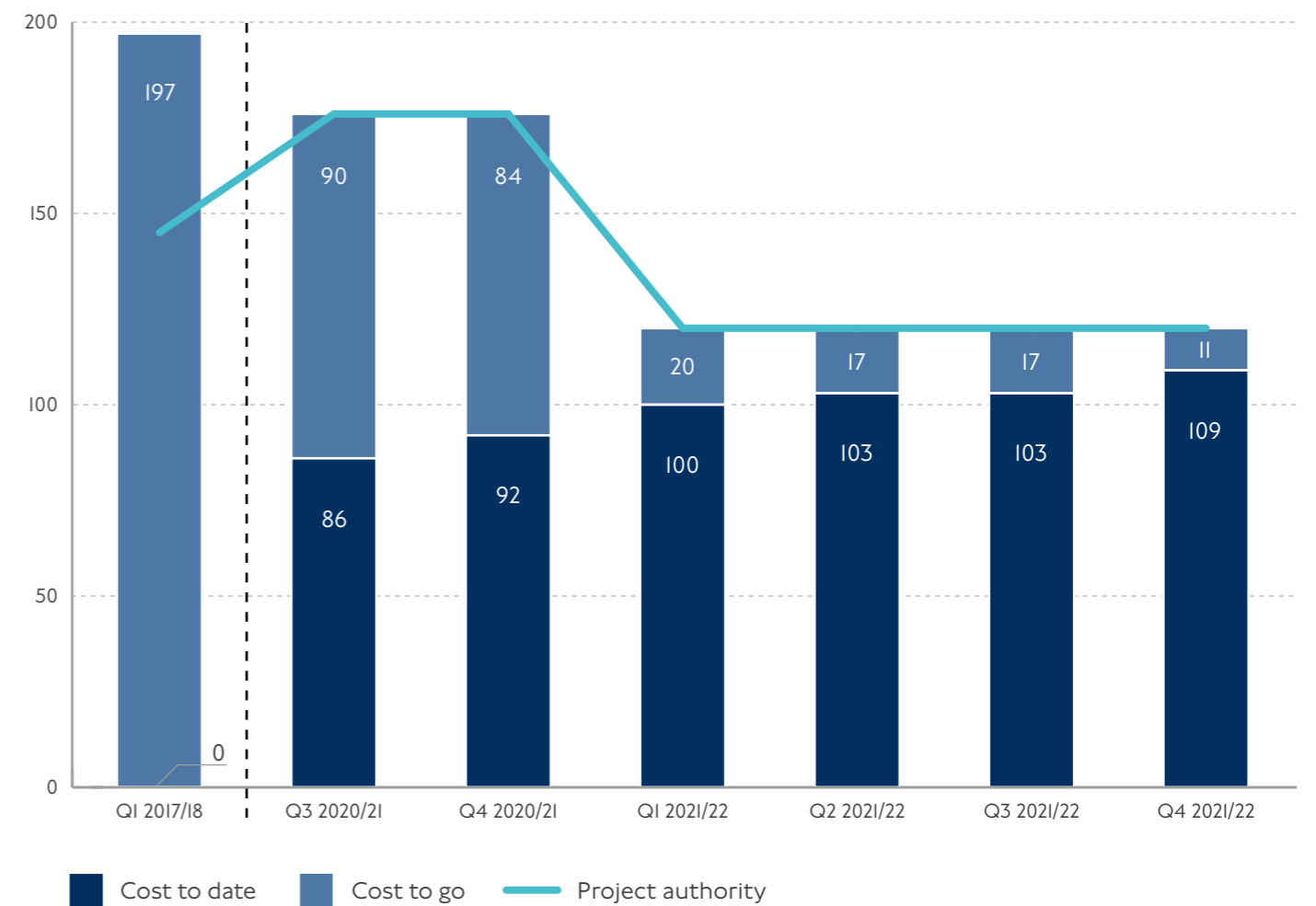
The lifts at Harrow-on-the-Hill were opened by the Mayor on 8 March. It was the 12th and final station to be delivered by the accessibility programme and means that 33.5 per cent of Tube stations are now step-free.

Without a long-term funding deal from the Government, it is not possible for us to progress any further schemes under the step-free access programme. Only contractually committed and third-party schemes are still being taken forward.

From 2 November 2021 to 10 February 2022, we held a public consultation on our future step-free access priorities and improvements online. We are reviewing the results and will share them with internal stakeholders shortly. We will begin work on prioritising stations and a public response to the survey will be published in summer.

Estimated final cost performance over time (£m)

Forecast completion date



Infrastructure renewals

Lifts and escalators

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2005/06 to 2022/23	480	46	526	904	378
Change since last Investment programme report					
No change	8	(73)	(65)	No change	

Financial commentary

The programme authority exceeds forecast cost as it was granted for a 25-year period in line with our supplier contracts. Future spend has been aligned to the December Programmes and Investment Committee paper and reflects the impact of the coronavirus pandemic and funding uncertainty. Our forecast cost remains under review and will be updated to reflect the managed decline scenario in the new financial year.

Performance over time

Investment in renewing our lifts and escalators has continued at a steady pace with work at key stations such as Marylebone, South Kensington and the Jubilee line stations.

Programme update

There are 447 escalators, 259 lifts and four passenger conveyors on the London Underground network, which are essential to ensuring customers have safe, reliable and quick access to our services. These

numbers will grow by 25 per cent by 2026 as a result of major station projects, the accessibility programme and the Elizabeth line. This programme provides the rolling asset renewals work to keep these assets in operation.

Maintaining and improving lift and escalator availability requires ongoing refurbishment and renewal. Typically, escalators need replacing every 40 years and lifts every 20 to 40 years, depending on the type. This means we would need to replace around 2.5 per cent of our escalator assets and four per cent of our lift assets each year to maintain our assets at the current level for state of good repair. This rate will need to increase as the number of assets grow. The interventions carried out are informed by the condition and performance of each asset. Our funding constraints mean we will not be able to meet this level of intervention and we are developing a plan that will limit the impact as much as possible.

Replacing an escalator or lift is a complex process. It must be fully dismantled and worked on in a very constrained space, while daily operations in the station continue. When we replace assets, we also try to standardise them where possible to reduce ongoing maintenance costs.

South Kensington

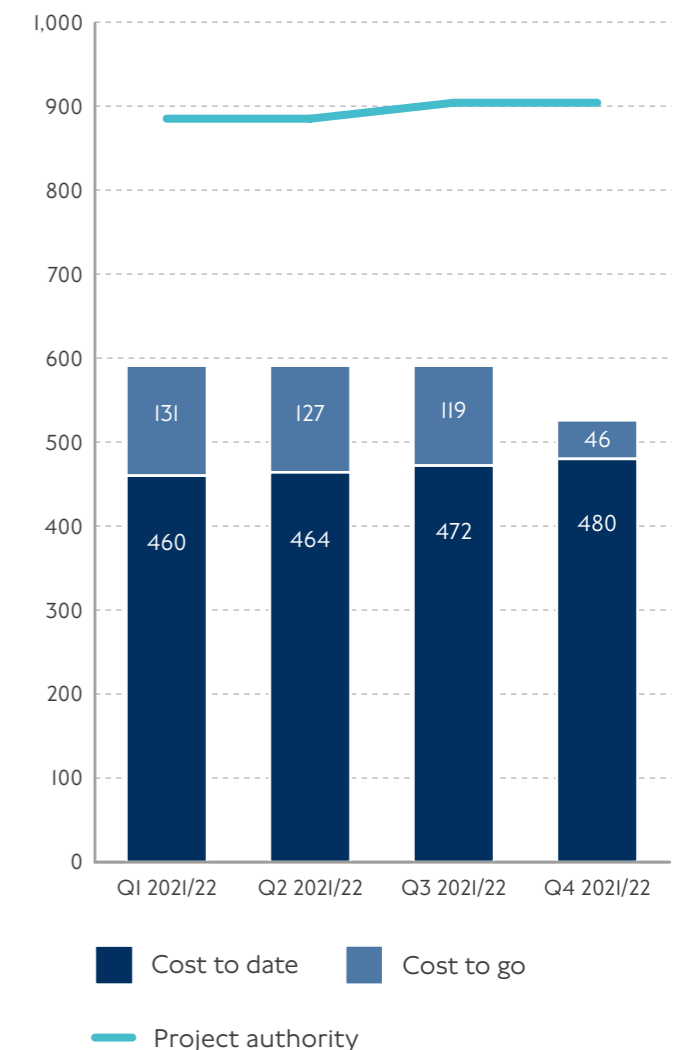
We completed works to replace the five life-expired escalators at the station at the end of May, and restarted Piccadilly line services.

As part of the work, we repainted the arcade stairways through to the ticket hall and down to the museum subway in a lighter, more welcoming colour scheme. We also replaced the tiles at the top and bottom of the new more reliable escalators and are restoring the heritage paving slabs in the arcade.

Marylebone

We have completed works to install a new escalator replacing the previous staircase and increasing escalator capacity and resilience at the station. We have also removed one of the two original life-expired existing escalators. We modified the civils structure of the station to accommodate the new escalator, which was delivered as planned in March, and have started to install it. All works are due to complete in 2023.

Estimated final cost performance over time (£m)



Oxford Circus

Refurbishment to improve the condition and reliability of the escalators at Oxford Circus station began in May 2021 and the fifth escalator was completed in April. Following prioritisation of funding, this will now conclude with works on a final, sixth escalator that will be completed in July.

Jubilee line

The rolling escalator refurbishment programme has delivered 11 refurbishments in the 2021/22 financial year as planned. Works have begun on the first three refurbishments planned for 2022/23.

Tottenham Hale

Works to replace the obsolete lift at Tottenham Hale station were successful and the new lift was bought into use on 22 December 2021. The team has completed the snagging works and is working to close out the project.

Borough

At Borough, the first lift was successfully replaced in April this year, and work has started on the second lift. This is due to be completed in August. Works were planned to coincide with the temporary Bank branch Northern line closure to help minimise disruption.



We regularly assess and update our lifts and escalators

Infrastructure renewals

Renewals: Civils, buildings and systems

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2018/19 to 2024/25	173	168	341	285	(56)
Change since last Investment programme report					
No change	19	(19)	No change	No change	

Financial commentary

The full impact of the move to a managed decline scenario on our future costs remains under review and will be updated in the financial year 2022/23.

Performance over time

Investment in the quarter accelerated as a result of civils works at the Grange Hill to Chigwell cutting, plus increased power and building asset renewals and the rapid rollout of the LED replacement programme, which will contribute to reducing our operating cost in future. Previous quarters' spend has been updated to correct a transposition error.

Programme update

This programme covers the essential renewals work for a range of assets across buildings and stations, civils, power, electricals and cooling to ensure safety compliance and continued reliability.

Buildings and stations

We have rolling programmes of targeted interventions to building systems, communications, fire and mechanical assets, and the built environment in stations, buildings and other Underground premises to improve asset condition.

We have now started works on site to replace obsolete communications equipment at King's Cross St Pancras, including station management systems, local area networks, CCTV, the public address and alarm system, lift intercom system, visual information displays and ticket hall information displays, as well as passenger help points.

We have completed concept and detailed designs to replace station information management systems, public address and voice alarm systems, as well as the passenger help point systems, at London Bridge, North Greenwich, Canary Wharf, Canada Water, Canning Town, West Ham, Southwark and Bermondsey stations.

Works have now started on site at London Bridge and North Greenwich.

Concept design at Liverpool Street and Charing Cross stations to address water ingress is progressing. Renewal works at Acton Town station entrance to flooring and wall tiling are now completed, reducing the risk of falling objects and trip hazards.

Welfare facility renewals

We are carrying out targeted renewals of staff welfare facilities at prioritised locations. The renewals will improve the condition of the facilities and the environment. We have awarded the main works contract and works are progressing on site.

Civils

Civils account for 30,000 assets across the network, providing structural support, stability and protection to the railway. The asset base includes more than 16,000 bridges and structures and 235km of embankments and cuttings, as well as tunnels, lighting masks and flood protection assets. We are assessing their condition to improve our understanding of our asset base, which will help us to plan future interventions.

Works are progressing on site to stabilise the cutting between Grange Hill and Chigwell stations on the Central line to ensure the continued safe running of the railway. We have begun feasibility work for future interventions to embankments and cuttings at priority locations.

Rail Vehicle Accessibility Regulations

Works have begun on site at Paddington Bakerloo line station for the construction of a platform hump, including fabrication of new, bespoke fire and interlocking machine room doors. Similarly, installation of manual boarding ramps is under way at a number of stations.

Power and electrical

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

Work is under way to replace 22 life-expired uninterruptable power supply units to ensure a continuous power supply to critical signalling assets on the railway. The first seven sites are commissioned into service, supply chain delays have hampered progress, but the remainder have now been delivered to site for commissioning by end of summer.

The procurement we began to replace 20 life-expired offline battery power inverter units supplying station emergency lighting systems has been temporarily paused due to market responses and reassessment of the strategy to address increasing obsolescence risks.

The project will include developing standardised modular equipment, which can be retrofitted into existing installations, and site trials to reduce the installation work and improve value for money.

We have replaced 16 traction isolation switches at Hainault depot to address equipment non-compliances and remove operational restrictions. Detailed design work is in progress for the next series to be replaced in 2022/23 at Ruislip depot.

A replacement high-voltage switchboard has been installed at Greenford substation and has undergone site acceptance testing ahead of commissioning due in Quarter 2.

We have completed procurement activities in readiness for a contract award planned in Quarter 2 for the replacement of the DC traction switchboard at Holborn station. These works will address existing operational restrictions and safety risks at this key Central line site.

Power control

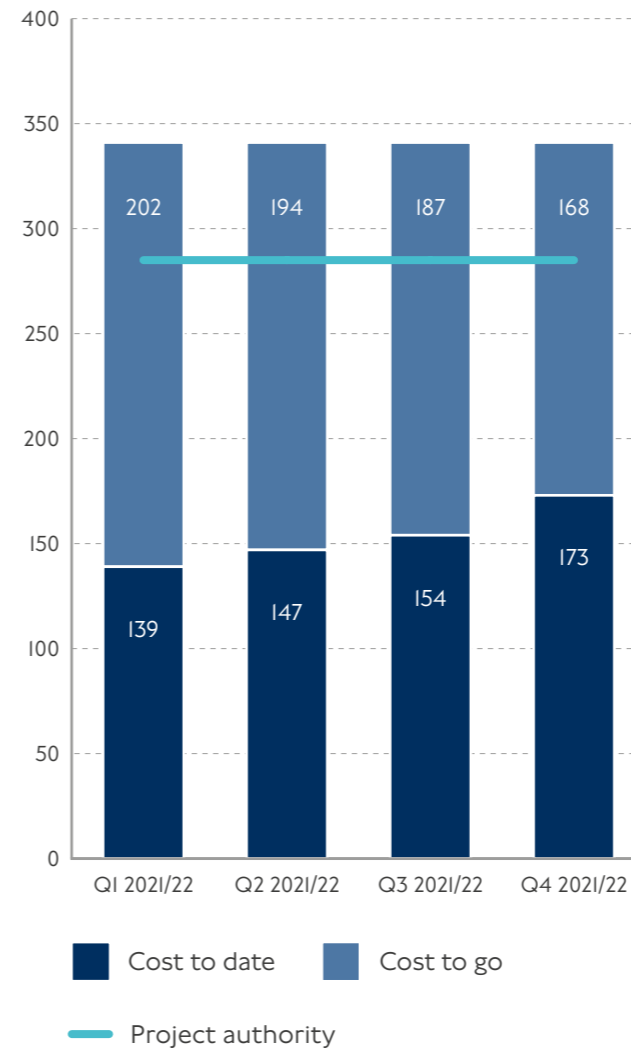
We have nearly completed the replacement of the network-wide power control system. This comprises control centres linking to circuit breakers across the network, which enable train traction control. Initial operator and maintainer training has started, with planned migration to the new system expected this summer.

The first of the control system upgrades on the electricity generators at Greenwich Power Station was completed in October. The second unit is currently in progress. The upgrades will continue in 2022/23 and remove obsolescence and improve the long-term reliability of the essential emergency generating plant.

LED lighting

We have continued with the planned conversion of traditional fluorescent lights to low energy LED lighting, improving efficiency and reducing ongoing maintenance costs. We completed 24 stations and high priority areas with three depots in 2021/22. Progression of these works will be temporarily paused due to the current funding constraints.

Estimated final cost performance over time (£m)



Train systems

Track renewals

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2020/21 to 2022/23	211	139	350	402	52
Change since last Investment programme report					
No change	57	(57)	No change	No change	

Financial commentary

The forecast cost to go to the end of 2023 is aligned to the December 2021 Programmes and Investment Committee paper, however the full impact of the move to a managed decline scenario remains under review and will be updated in the new financial year.

Performance over time

Despite a challenging start to delivery in 2021/22, we finished the year strongly in Quarter 4, including successful significant points and crossings works at Northfields over Christmas. Due to uncertainty around available funding in 2022/23, our planning has ensured that impact on asset condition, commercial and planning of the various possible levels of funding is understood at each key decision point. Since Quarter 3, we are focusing on delivering a reduced level of core scope in 2022/23, while continuing to plan additional high priority works if more funding becomes available.

Programme update

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 it. Each section of track may have a residual life of between 40-60 years, meaning we must renew two to three per cent of our track every year, as well as making ongoing component replacements.

We aim to progressively install high integrity, low-maintenance, flat-bottomed track on concrete sleepers, replacing bullhead rail on timber sleepers, some of which has been in service since the early 1900s. This new, modern track is more stable and reliable.

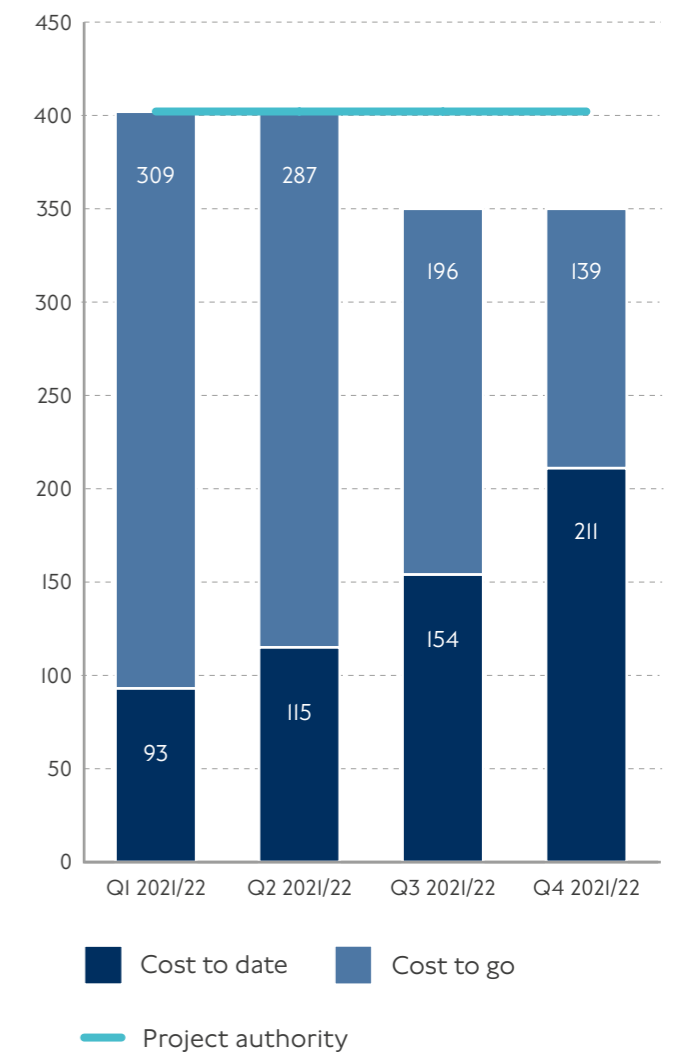
We completed our second packages of work at Ruislip depot, which will enable the future requirements and operations of the depot. This included 1,600 metres of ballasted track renewal and installing seven points and crossing units. One further work package is planned to complete the redevelopment of Ruislip depot.

Between January and March, we installed 930 metres of new ballasted track on the Central, District, Metropolitan and Piccadilly lines and achieved our key programme milestone by installing eight kilometres of new track in the 2022/23 financial year.

Other track renewals continued during Quarter 4, with our track delivery unit completing 560 metres of new concreted track in the deep Tube areas, as well as replacing 1,300 metres of bullhead rail with the more modern flat-bottom form.

On the open sections of the sub-surface rail, we renewed 300 metres of drainage channels.

Estimated final cost performance over time (£m)



Train systems

Rolling stock

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2016/17 to 2027/28	260	840	1,100	722	(378)
Change since last Investment programme report					
No change	5	(5)	No change	No change	

Performance over time

An increase in both forecast cost and programme and project authority was driven by improving information on the Central line fleet renewals following the completion of the prototype, and increased understanding of the engineering vehicles locomotive works.

The full impact of the move to a managed decline scenario on our forecast cost remains under review.

Programme update

We have more than 600 Tube trains operating across 11 lines, with the oldest trains entering service in the 1970s. We must ensure all trains remain safe and operational, which requires certain interventions. Some of these are maintenance activities and others are needed due to changes in regulations arising from safety issues, poor reliability and performance, unacceptable costs or system obsolescence.

To better predict interventions, we have developed a 25-year fleet cost model, which feeds into our long-term capital plan. The model has various scenarios that map out when each fleet may be replaced and the interventions required to enable them to reach this date.

We are purchasing a new fleet for the Piccadilly line. There are no other confirmed fleet replacements.

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

Accessibility

On the Bakerloo and Central line fleets we have a programme of works critical to improving accessibility. We are installing and testing prototype systems.

We have completed initial changes on the first Bakerloo line train, including wheelchair bays, grab poles and flooring. We have also installed LED lighting. We are progressing designs and prototype installation for the passenger information system and have begun static testing of the prototype system.

On the Central Line Improvement Programme, we continue to conduct full mainline (all stations) dynamic testing. We have negotiated approvals to replace manual boarding ramps at stations including Marble Arch, Leytonstone, Loughton and Mile End. The platform ramps will align to the new wheelchair bays being installed on the Central line trains.

Reliability

We will be replacing the unreliable direct current power traction system with a modern, more reliable, alternating current equivalent. After completing extensive offsite eight-car high-speed testing in Old Dalby, we have successfully conducted multiple full London Underground mainline (all stations) dynamic tests. In the meantime, we have procured all materials and have started installation on a further train. As part of the Jubilee line reliability

improvement programme, we have completed the feasibility study on reducing the risk of structural fatigue cracking in the carriage underframe. The project secured authority and capital investment to proceed into concept design and delivery, and the invitation to tender activities is under way.

Safety

We are working to improve customer safety on the Bakerloo and Central line fleets. The first Bakerloo line train with new LED lighting was returned to service in Quarter 1. We have successfully completed eight four-car units, and three three-car units and put them in service with no issues. After prolonged periods with a technical support shortfall, the project has now secured engineering support to progress residual works designs. Additional facilities are also procured to enable full production during the summer.

On the Central line, we have completed the installation and dynamic testing for all electrical systems on one of our trains, which includes the passenger information system, CCTV, data transmission system and saloon design. LED lighting has been installed and static train testing has been completed. This prototype train has successfully undertaken mainline dynamic testing on all Central line stations. This has identified some minor integration issues which the team are working with our suppliers to resolve.

Engineering vehicles

We are developing a vehicle that will change the way we replace track by mechanising concrete track renewal in the deep Tube. Made up of three wagons, a prototype vehicle has been fitted with track renewal equipment, handrails and steps. Multiple trials were completed at Ruislip depot with final approval being sought ready to support upcoming deep Tube track renewals.

We are purchasing a new fleet of engineering wagons from the world’s largest rolling stock manufacturer based in China. The first four prototype wagons have now been joined by a fifth pre-production wagon, which has started an inspection and quality assurance programme. Once dynamic testing has passed, they will undergo infrastructure testing on the Tube network. The remaining 66 wagons will enter production in China before they are shipped to the UK in early 2023.

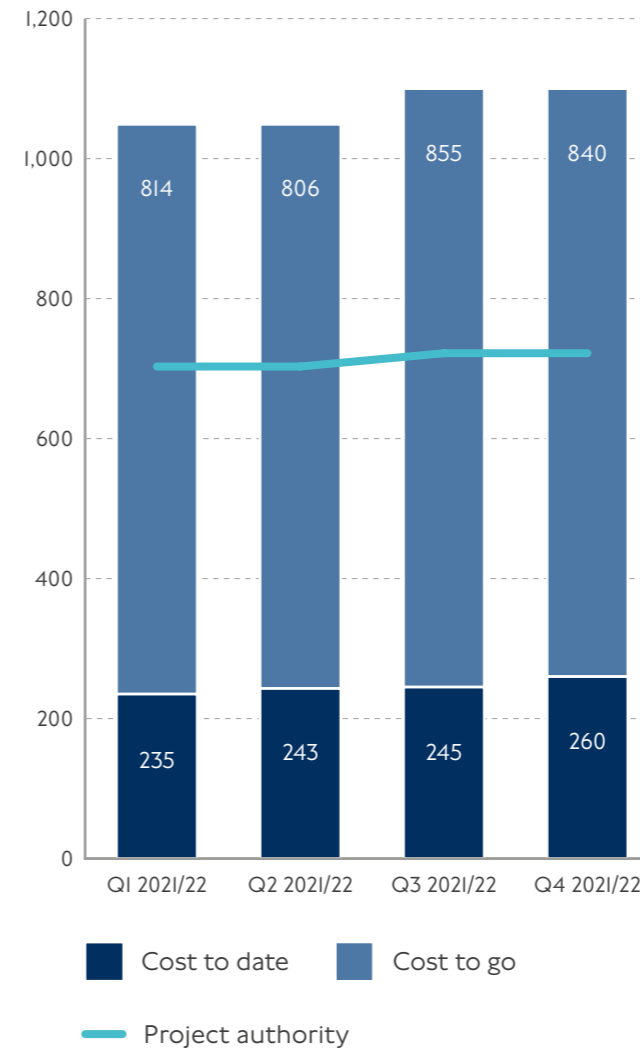
We purchased two rail-mounted cranes and eight tilting wagons from Kirow in Germany for modular points and crossings renewals. The cranes have been successfully operated within the Ruislip depot to support local track renewals works. The cranes are undergoing the final stages of approval before being granted a consent to operate for use in open sections of the Underground network. Once this is achieved, we will seek sub-surface and

tunnel environment approvals. The cranes and tilting wagons enable us to transport wide track panels from the manufacturer’s site to the track renewal location, giving time and quality benefits.

The Remote Track Monitoring project has drafted a contract award recommendation for the design and build of new track geometry recording equipment. The project will mount this equipment on two sets of host wagons, which will be hauled by battery locomotives across the network, replacing the single, life-expired track recording vehicle currently in operation. A new project has also been initiated to reduce the likelihood of unplanned track recording vehicle outages before its replacement.

We are exploring options, supported by a completed early market engagement exercise, to replace the aged, existing battery locomotive fleet. An integrated technical and commercial strategy is being developed to re-engage with the industry and understand market readiness to address the Tube network’s multiple operating requirements. These locomotives haul most of our engineering vehicles around the network, but the fleet is close to the end of its extended service life. Part of this project will ensure the existing fleet remains operational while the replacement fleet is being progressed.

Estimated final cost performance over time (£m)



Train systems

Fleet heavy overhauls

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2016/17 to 2026/27	115	487	602	361	(241)
Change since last Investment programme report					
No change	22	(22)	No change	No change	

Performance over time

There has been steady progress for most of the year with a ramp up towards the latter part as the Metropolitan line and the Victoria line go into delivery.

The full impact of the move to a managed decline scenario on our forecast cost remains under review and will be updated in the new financial year.

Programme update

To ensure train fleets remain safe and reliable, we conduct a planned programme of essential heavy maintenance. This ensures all core systems meet the required standards. The programme delivers large-scale heavy maintenance activities on our existing fleet of passenger rolling stock and rail adhesion trains.

The work requires each train to be removed from service for several days or weeks and includes overhauling suspension, wheelsets, motors, brake systems and auxiliary equipment.

This programme delivers large-scale heavy maintenance work on our fleet of passenger and rail adhesion trains.

Victoria line

We continued to upgrade the pressurised ventilation fan systems completing work on the fourteenth train, which provides air in place of air conditioning and reduces maintenance. Delivery of the first five coupler overhauls was completed. The doors overhaul is due to begin in early July.

Metropolitan line

Physical work is substantially complete on the first six Metropolitan line trains, with the exception of train equipment used to transfer electric current from the third rail, which was completed in April. This will enable the programme to start ramping up.

Piccadilly line

On the Piccadilly line life extension works, 85 per cent of the floor scope is now complete. Over the financial year, 150 overhauled motors were delivered, which was 16 ahead of plan. We have completed 25 per cent of the second lift cycle to take the fleet to end of life.

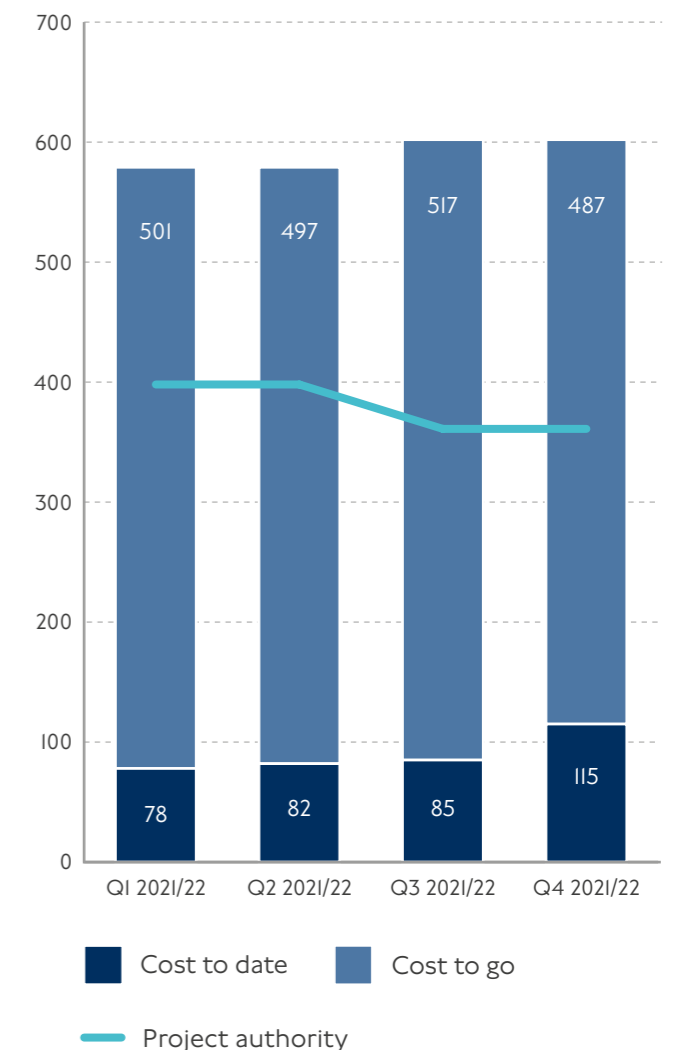
Jubilee line

Mobilisation continues at Stratford Market depot, with further recruitment and validation of work instructions. Procurement activities progressed, and the first phase of delivery started in April. We mobilised a team to support the mitigations needed to keep the trains in operation until the heavy overhaul takes place.

Adhesion train

Preparations have continued for our rail adhesion units for the Central line. These apply a substance to manage adhesion levels when leaves fall on the tracks. The first train has had this year's work completed at Acton and we moved the second train to Acton in April to start work on it.

Estimated final cost performance over time (£m)



Train systems

Signalling and control

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2018/19 to 2027/28	104	320	424	307	(117)
Change since last Investment programme report					
No change	7	(7)	No change	No change	

Performance over time

The performance over time baseline has been reset following the December 2021 Programmes and Investment Committee paper, which extended our authority to 2028 (previously 2025). In the quarter, work has started on the Central line signalling and control life extension following contract signature with our partner in Quarter 3, and we have ramped up our programme to remove hazardous materials from our signalling estate.

Programme update

Signalling and control systems are essential for the safe and efficient operation of train services. Some date to the early 1960s and are now obsolete and increasingly hard to maintain. We continue to move towards more modern, computer-based systems that provide greater service capacity. While these require less day-to-day maintenance compared with traditional electro-mechanical signalling; they do need significant obsolescence-driven renewals during their life.

Large upgrades, such as the modernisation of the Circle, District, Hammersmith & City and Metropolitan lines, are replacing systems across the sub-surface lines. The Jubilee, Northern and Victoria lines have relatively modern, computer-based systems, however as computer technology is fast-paced, the availability of support and spares declines as systems age, and obsolescence risk increases.

On lines such as the Bakerloo, Central, Piccadilly and Waterloo & City, recent financial challenges have seen planned upgrades scaled back, and in response we have developed a targeted incremental approach to upgrading and life extension.

This programme has been established to extend the life of current systems and contain obsolescence risk.

Signalling renewals

The Bakerloo line control system life extension project has completed all works on site, with control of the line now being managed by the replacement computers. The decommissioned equipment dating from the 1980s is of historical significance and has been shipped to Cambridge Computer Museum to become part of the permanent display.

In our project to remove track circuit capacitors that potentially contain hazardous polychlorinated biphenyls, we have awarded a contract for supply of new capacitors. This now includes further capacitors that will remain in service longer because of the descoping of the modernisation of the Circle, District, Hammersmith & City and Metropolitan lines.

Following award of contracts to Siemens for the life extension of the Central line signalling and control systems last quarter, works have begun to ramp up on the projects. This is critical to maintaining the safety and reliability of the line in advance of future upgrades. The projects are in the early stages of detailed design and delivery. In parallel, supporting works for fibre communication systems and cable route management systems are being designed.

Two new obsolescence projects are in the option selection stage and will start this year. These are the midlife overhaul of the platform edge doors on the Jubilee line and re-wiring the interlocking machine room at Acton Town.

Incremental signalling upgrade

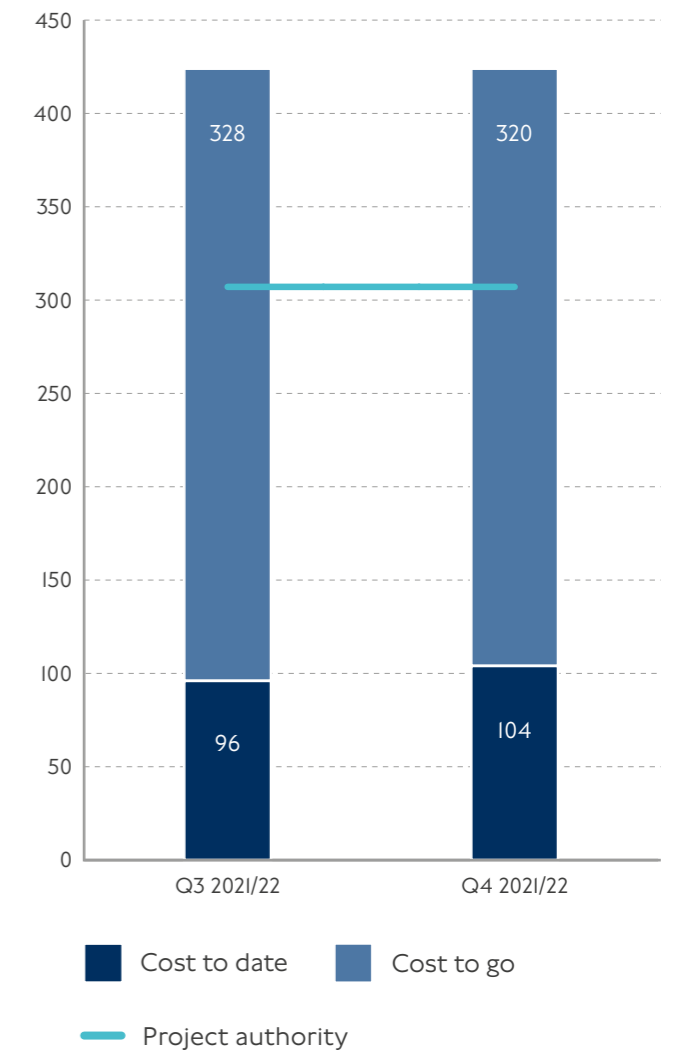
The first five-year tranche of the incremental signalling upgrade programme is progressing well, with concept and detailed design starting on updating the Bakerloo line control system.

The Northern line vehicle control centre (central computing platform running the signalling) replacement project is in the tendering stage, approaching contract award. This investment will support the reliability of the signalling system, and it is expected that a contract will be awarded in Quarter 2 this year. The Northern and Jubilee line train operator display replacement project is preparing tender documents and it is expected that a contract will be awarded in Quarter 4 this year.

Regarding the Central line incremental upgrade programme, we have completed early market engagement with suppliers and the supplier feedback report was issued to the 13 respondents of the market questionnaire. Technical evaluation of the findings is under way.



Estimated final cost performance over time (£m)



Technology

Forecast completion	Cost to date (£m)	Cost to go (£m)	EFC (£m)	Programme and project authority (£m)	Variance: EFC versus authority (£m)
2019/20 to 2024/25	103	102	205	163	(42)
Change since last Investment programme report					
No change	8	(8)	No change	68	

Financial commentary

Authority has been reconciled to include £67.9m of authority granted to the Connect project (as part of the London Underground Technology Programme) by the Programmes and Investment Committee in December 2020. While Connect costs have been included separately in previous reports, we are now consolidating these figures to reflect the latest Programmes and Investment Committee approvals and ensure accuracy and consistency moving forward.

Performance over time

Last quarter we delivered new radio base-stations and rolled out critical incident management at several stations.

Programme update

Our technology assets include a network-wide radio system and data network as well as all the software to manage our assets and deliver customer service. The fast-evolving IT market necessitates

a programme to keep software in manufacturer support as well as taking advantage of new technology to improve the way we deliver service.

Networks and connectivity

We are continuing to upgrade key components of our Connect radio system and are now focusing on rolling out new radio hardware base-stations. We have replaced key hardware at more than 80 of the required 293 locations. This work will enable the Connect system to function into the 2030s.

We have delivered Critical Incident Management (CIM) functionality at 62 stations, enabling us to remotely control and evacuate a station in the event of a critical incident, such as a terrorist attack. We have also upgraded our CCTV at 75 stations, enabling the British Transport Police to remotely view our camera footage.

Assets and staff tools

To improve our approach to asset management and long-term planning, we are consolidating our asset management information systems into a single tool for London Underground and London Trams. We are migrating London Underground assets onto this new single platform. This is anticipated to complete in early 2023.

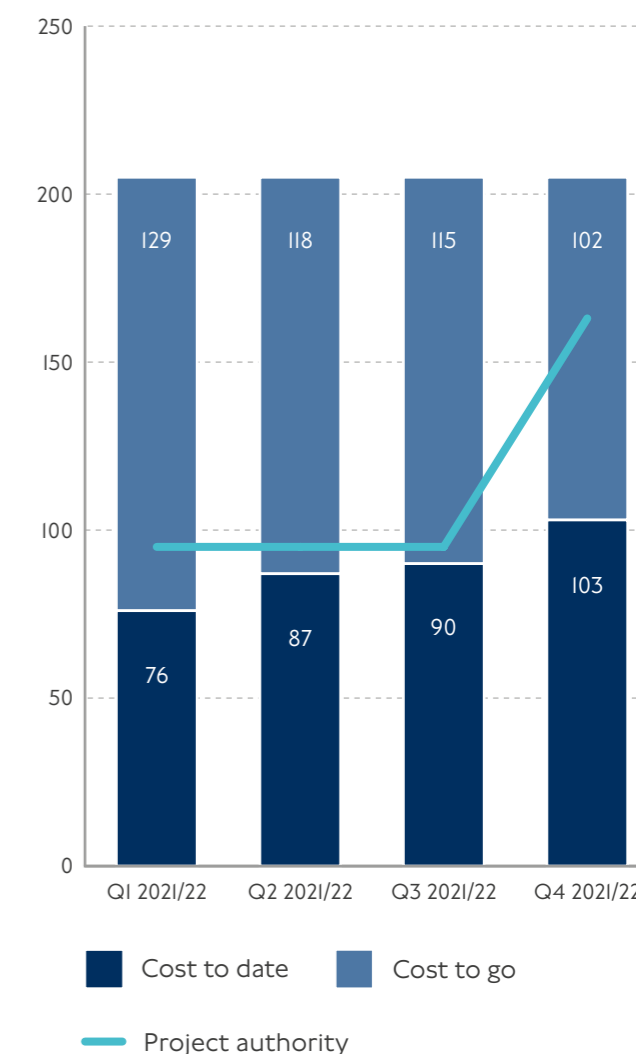
We have delivered more than 7,000 new tablets and mobile phones to our front-line staff (replacing obsolete models), allowing us to continue to provide excellent customer service and respond quickly to incidents on our networks. We have continued to deliver new body-worn cameras to improve the safety of both our staff and our customers.

We have also completed works to improve the quality of our condition data by undertaking surveys on a wide range of assets on our network. This work has helped us to improve the planning and co-ordination of essential maintenance works over the coming years.

Data, digital and revenue

To tackle fare evasion, we have continued work on the development of our irregular travel analysis platform. This tool enables us to target fare evasion more effectively and has directly contributed to the identification and prosecution of fare evaders. We have also made changes to our back-office systems to reduce the number of card clash refunds given in error.

Estimated final cost performance over time (£m)



Surface transport

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



Healthy Streets

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	262	86	348	319	(29)
Change since last Investment programme report					
No change	16	(20)	(4)	10	

Financial commentary

The five-year forecast from 2020/21 to 2024/25 has reduced by £4m since the last report.

The movement in spend primarily relates to boroughs overestimating the value of work delivered and claims being received for amounts lower than anticipated. We are working with the boroughs to improve the timeliness of periodic updates to ensure minimal movement between estimates and actual figures submitted.

The forecast cost reduction reported reflects ongoing uncertainty and funding constraints under a managed decline scenario, in which we continue to forecast the completion of the Old Street Roundabout project, active travel and key safety-related schemes across the network. Continued investment in active

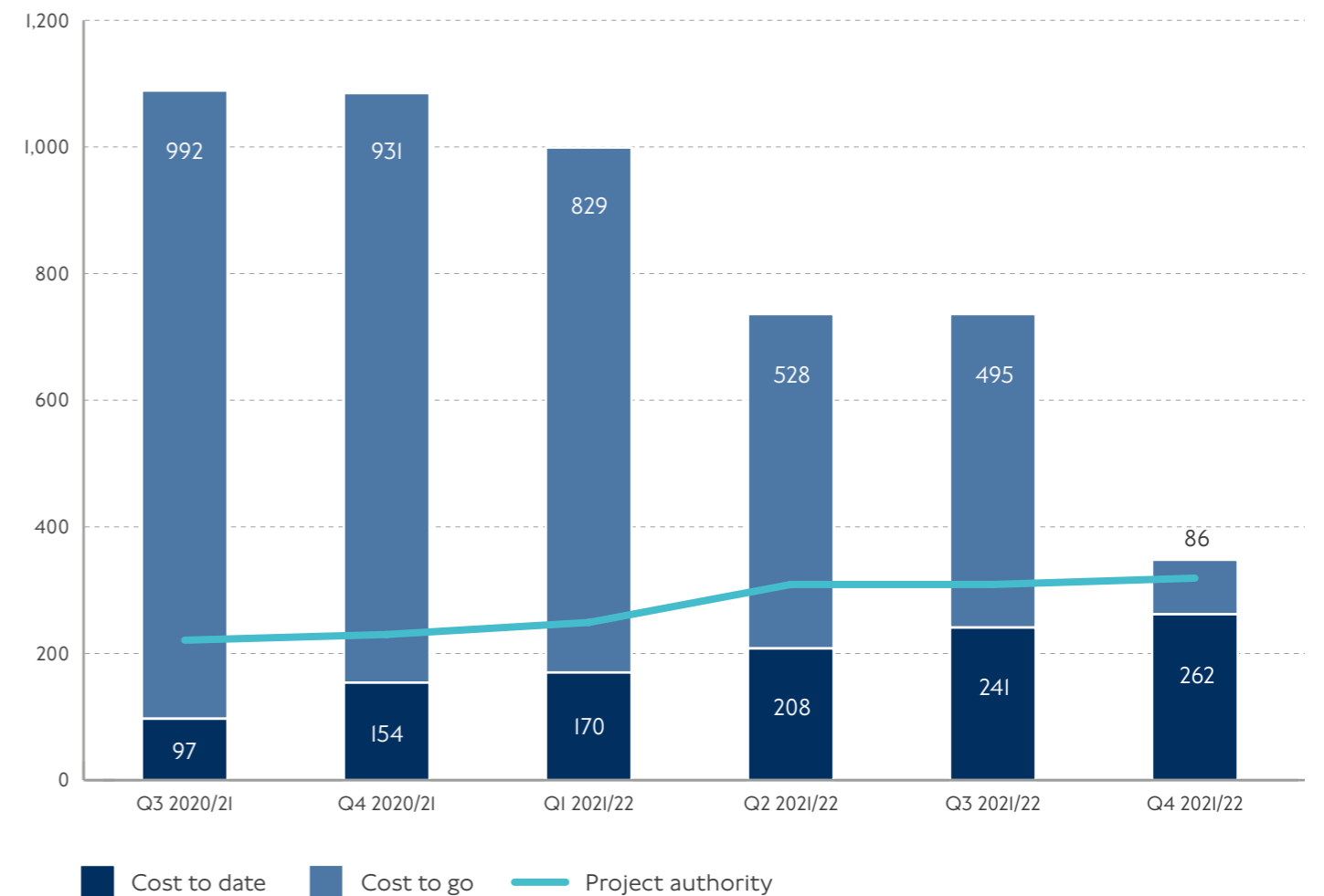
travel will need to form part of a longer-term, sustainable capital funding deal with the Government. The cost forecasted to 2024/25 in this report reflects the managed decline scenario and is in line with our assumptions made in the recent GLA budget.

Performance over time

Our forecast cost over the last six financial quarters has reduced due to funding challenges driven by the recent pandemic. This has resulted in several projects put on hold as we moved to a managed decline scenario.

Our programme and project authority has increased following Programmes and Investment Committee approval in March 2022 to cover Old Street Roundabout, active travel and safety-related projects across the network.

Estimated final cost performance over time (£m)



Programme update

The Healthy Streets programme continues to reduce road danger in line with the Vision Zero action plan, and make it easier to walk, cycle and travel by bus across London. It will accelerate progress towards mode shift, decarbonisation, economic recovery and tackling health inequalities. Healthy Streets complements our other initiatives such as Crossrail, the electrification of the bus fleet and future Road User Charging programmes, as well as helping to power London's wider recovery. Funding is provided to London's boroughs to achieve these outcomes on their highway networks.

Old Street Roundabout

Construction is progressing at Old Street Roundabout. The new design 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 subsurface shopping arcade.

Construction is continuing with drainage, paving and kerbing on the four approach arms to the junction. Works are also continuing with the infilling of the northeast entrance to the station, Subway 1 and the surrounding paving works, including the water connections required from Thames Water to service the station. The south west entrance to the station, Subway 3, remains open for public use until late June once the final traffic management phase has been implemented. Similarly, works are continuing with the infilling of the northwest entrance ramp, Subway 4, and construction of the new passenger lift.

The passenger lift pit has been completed and works started on the lift shaft on 22 February. Construction of the concrete shaft for the new goods lift was completed on 8 February in readiness for installation of the new lift car from July.

Construction of the new main station entrance is continuing with the superstructure works. Temporary supports and propping were installed to receive the four precast concrete arms and ring beams which hold up the green roof structure. These works were completed on 25 March and were followed with installation of the roof deck in April and the glazing will begin from August 2022. The new station entrance stairs are scheduled to open for public use in late June while work continues on the above roof structure and glazing.

Refurbishment of the clerestory roof structure above the station began on 1 February following installation of a temporary crash desk in the subsurface area to help facilitate these works and provide a safety protection to the public using the subways to and from the station. These works will tie into the construction of the new bin store and UK Power Networks (UKPN) substation at surface level on the western side of the peninsula area, which continues to progress well. UKPN has completed all their works on site and the substation is now energised to provide the required power supply for the newly built assets.

Installation of the critical fire safety systems works in the below surface shopping arcade area, both public and

retail, are continuing as planned, with ongoing installation of new mechanical, electrical and communication equipment. Works on the east side retail units began on 3 February and will be followed with the west side retail units in the summer.

Completion of the project is scheduled for spring 2023 with the highway works substantially completed by winter 2022.

Cycleway 4

Construction work along Evelyn Street is progressing well and the project is now 80 per cent through with completion planned for summer 2022. The Royal Borough of Greenwich's works to Creek Road bridge has been reprogrammed for autumn 2022 and plans are now being developed to open the cycle track on the Creek Road section of the route for June 2022.

Cycleway 9

Work to transform Hammersmith Gyrotory is progressing well and expected to be completed by mid-July 2022. Work along Chiswick High Road from Chiswick Lane to Goldhawk Road, which is being delivered by the London Borough of Hounslow, is also progressing well and is planned to be completed in June 2022.

Responding to the coronavirus pandemic

Borough delivery continues, with more than 20km of cycling routes under construction. Westminster have completed their section of Cycleway 27 between Great Portland Street and Talbot Road. Barking and Dagenham have now substantially completed Cycleway 42; a 4km cycle route between Barking Town Centre and Barking Riverside.

Work is ongoing with the Future of Temporary Schemes Programme, to determine the next steps for each scheme delivered through the Streetspace for London programme. To date, several schemes have transitioned from temporary to experimental schemes, including making some improvements on site.

The A21 Lewisham to Catford and the London Bridge and Borough High Street schemes have recently made this transition in March 2022. Works continue on changes to the experimental Cycleway 8 upgrades on Grosvenor Road, and works started on a new experimental scheme at Mansell Street in January 2022, which will provide an important cycling connection between Cycleway 2 and Cycleway 3 and were completed in late April 2022. Following the local elections in May, several public consultations were launched as part of the experimental schemes process, which requires a six-month objection period and public engagement to inform any future decision about the experiment.

The boroughs have also been reviewing temporary schemes before the end of the relevant Traffic Regulation Orders and making decisions on whether they should be removed or retained, with or without amendments. Some examples include the London Borough of Hackney, which made 300 school streets permanent in March 2022; the London Borough of Islington, which agreed to retain Cycleway 38 connecting Holloway and Pentonville Roads; and Westminster City Council, which will retain 11 cycle lanes across the borough following positive public support.



Lowering speed limits is a crucial way to reduce collisions

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. This programme is vital to the Mayor's Vision Zero ambition to eradicate fatal and serious injury collisions from London's roads by 2041.

The second phase of the programme is under way, and as detailed in the recently launched Vision Zero progress report, seeks to reduce speeds by 10mph on more than 140km of our roads. In 2021/22, we reduced the speed limit on almost 30km of our road network, surpassing our strategic milestone of 25km including: A13 Commercial Road; A10/A503 corridors in Haringey; A107 corridor and A23 London Road. Additionally, the whole of Westminster is now 20mph, with the exception of the Westway flyover where speeds have been reduced to 30mph.

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

Safer Junctions

In April 2017, the Safer Junctions programme highlighted 73 of the most dangerous junctions on our road network, defined as those with the highest vulnerable road user collision rates. Work to 43 of these junctions is now finished, following completion of new pedestrian crossings and cyclist safety improvements at Camden Road/Camden Street. Design work continues on the remaining 30 junctions, including detailed design of York Road roundabout and Holloway Road/Drayton Park (respectively delivering motorcycle and pedestrian safety measures).

On 26 November 2021 a new pedestrian crossing was introduced over Battersea Bridge, where a pedestrian was tragically killed at the beginning of 2021, with the second phase now in design. Subject to funding, we propose to engage on 10 further Safer Junctions by 2024.

Air quality

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	223	178	401	319	(82)
Change since last Investment programme report					
No change	11	(26)	(15)	64	

Financial commentary

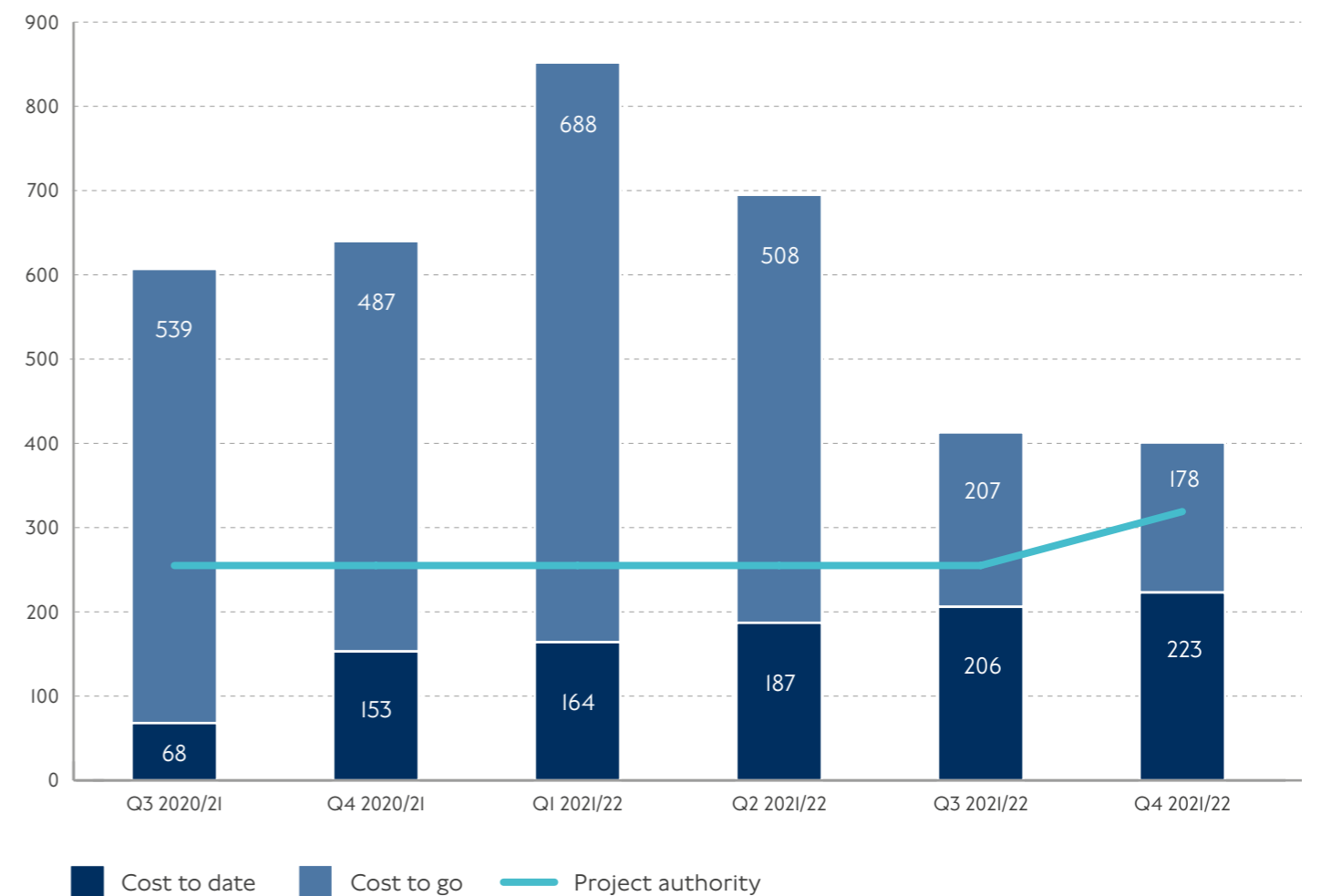
The five-year forecast cost from 2020/21 to 2024/25 has reduced by £15m since the publication of the last report. This reduction is mainly driven by the reduction in estimate for the Silvertown Tunnel Road User Charging infrastructure by £20m due to more certainty around costs from Capita reducing both risk and base. The programme and project authority was uplifted in March 2022 at the Programmes and Investment Committee.

Performance over time

Over the last six financial quarters, our forecast cost has fluctuated, driven by funding challenges brought about by the pandemic, which has meant several projects have been put on hold as we moved to a managed decline scenario. Pipeline programmes will remain under review, subject to available funding. The potential 2023 Road User Charging scheme forecast is not considered part of the Air Quality forecast while funding is reviewed.

Our programme and project authority has increased following Programmes Investment Committee approval in March 2022 to cover the Road User Charging Programme Projects to either P8 2022/23 or P13 2022/23, subject to project development and Mayoral decision.

Estimated final cost performance over time (£m)



Programme update

Electric vehicle strategy

We published our electric vehicle infrastructure strategy at the end of 2021, setting out what is needed for London to have the required level of EV infrastructure by 2030 and how this will be achieved.

Following the electric vehicle infrastructure strategy publication, an assessment has been made of the delivery status against each of its 21 commitments. The commitments set out how we will fulfil our role across land access, facilitation, strategic oversight, and financing.

Two priority commitments have been classified as a risk to delivery in the absence of Government funding. Firstly, the development of a real-time and open Application Programming Interface (a software platform which shows when and how electric vehicle charging points are being used) of all charge points and secondly, establishing a commercial fleet database to support a switch to electric vehicles. These commitments are looking to address barriers and/or issues that have been raised by users, with the Application Programming Interface looking to improve the user experience in finding and using charge points and the database to help improve the understanding of the charging needs and demand hotspots for commercial vehicles. Mitigations to address the risks to these commitments are being investigated.

The Office for Zero Emission Vehicles published a UK electric vehicle infrastructure strategy on 25 March 2022. We are exploring funding opportunities available and implications for London's electric vehicle infrastructure strategy.

In mid-May, we confirmed in a press release that we have reached a significant electric vehicle milestone with more than 10,000 charging points now available for public use across the capital. This is about a third of the UK's total and an 85 per cent increase since 2019. London continues to lead the way with 111 electric charging points per 100,000 people, which is more than double the UK average of 45.

Electric vehicle infrastructure delivery

The electric vehicle infrastructure delivery project is a key commitment within the recently published electric vehicles infrastructure strategy, and it's designed to use GLA member organisations' land to accommodate charge point infrastructure.

Following some detailed market engagement, including interviews with key electric vehicle industry suppliers and charge point operators, we have presented a single preferred option for a delivery model to the Electric vehicle infrastructure delivery steering group. The recommended model will negate any capital investment from us or GLA member organisations, while leasing out sites to charge point

operators and negotiating a revenue sharing arrangement. Some additional cost and revenue modelling has been conducted, with sensitivity tests applied to examine assumptions and confirm the contractual relationship us and the GLA as landowners could have with private operators. In addition, we have achieved initial approval for using the Crown Commercial Services 'Dynamic Purchasing System', as a preferred procurement mechanism. This will, however, be subject to a procurement strategy being finalised in late summer. A further contribution from the GLA Collaboration Board of £520,000 was secured on 10 March, to enable the project to proceed to a point of tender. We have also now assessed more than 550 potential charge point locations across the GLA estate, with approximately 70 per cent passing the initial stage of site evaluation.

Zero-emission bus fleet

We continue to add zero-emission buses to the London fleet as quickly and affordably as possible, with an aim to make the entire fleet zero-emission by 2034, plus options for bringing this forward to 2030 if funding for vehicles and infrastructure can be provided by the Government. At the end of March 2022, there were 800 zero-emission buses in the fleet, including 20 hydrogen fuel cell buses, operating across multiple bus routes, helping to reduce CO₂ emissions and tackle air pollution across the capital.

We are aiming for around 10 per cent of our 9,000-strong fleet to be zero-emission by spring 2023, subject to manufacturing supply chains and vehicle delivery, and the essential upgrade of power at multiple bus garage sites around London. The timing and quantity of further orders are still dependent on reaching a long-term funding settlement with the Government.

Zero-emission buses will help meet the Mayor's overall target for London to have net-zero emissions by 2030. They will not only support the Government's wider plans to cut CO₂ emissions in the UK by 68 per cent compared to 1990 levels by 2030, but support British manufacturing, innovation and jobs – and reduce reliance on vehicles powered by fossil fuels such as diesel.

Asset investment

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	217	575	792	494	(298)
Change since last Investment programme report					
No change	43	(54)	(11)	No change	

Financial commentary

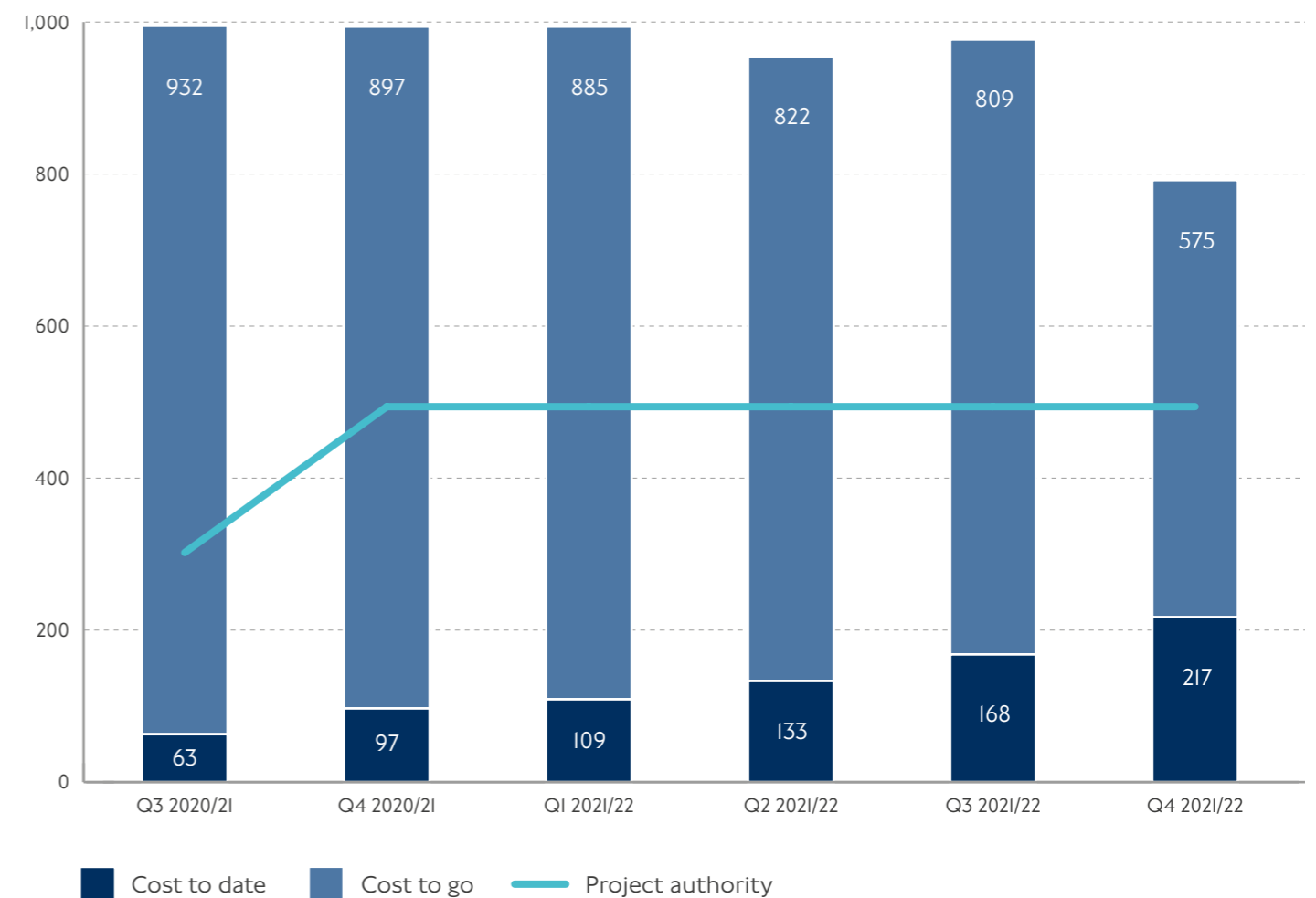
The five-year cost forecast from 2020/21 to 2024/25 has reduced by £11m since the publication of the last report. The reduction is mainly a result of us rephrasing some of our major renewals projects, where we deferred activities under a number of larger schemes to ensure that an affordable programme can align with our critical asset priorities. Also, the asset investment portfolio has delivered more than £6m of cost reductions in the 2021/22 financial year, where project teams found more efficient ways of working and had more value for money from suppliers.

Performance over time

Over the last six financial quarters, our forecast cost has fluctuated, driven by funding challenges following the recent pandemic which have resulted in several projects being put on hold as we moved to a managed decline scenario.

Our programme and project authority was increased at the December 2020 Programmes and Investment Committee meeting. This includes all spend up to the end of 2022/23.

Estimated final cost performance over time (£m)





We are renewing the systems that support Blackwall Tunnel

Programme update

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

Blackwall Tunnel Southbound

We have completed the concept design for the major renewal of Blackwall Tunnel Southbound. The project aims to renew critical systems that support the tunnel operation including lighting systems, concrete repairs and CCTV systems. We have identified potential options for how the construction can be undertaken. We will select a preferred construction option, based on detailed modelling assessments, before issuing a tender for the detailed design stage of the project by late summer 2022.

Gallows Corner

The Gallows Corner flyover is one of our highest priority assets to renew due to its age, condition and the current restrictions that are in place. We have completed the design and feasibility work for options to renew or replace the flyover. We are finalising our option selection before submitting a business case to the Department for Transport seeking a funding contribution through the Major Road Network programme. We plan to submit the business case in the summer and anticipate a decision from the Department for Transport by the autumn.

A40 Westway

The A40 Westway is a key strategic route and one of the busiest on our road network. Since the last report, we have successfully completed a number of full weekend closures both eastbound and westbound between 11 February and 3 April 2022. The weekend of 25-27 March was reduced to 30 hours from 55 hours, due to the provision made for the Ukraine Solidarity march at Hyde Park.

We are also working on the structure using single-lane closures to minimise disruption during the working week. The replacement of the safety and operationally critical roller shutter joint is planned to continue until the summer.

Westminster Bridge

Hostile vehicle mitigation works began on 15 November 2021. The installation of a new segregated cycle lane, installation of bollards and carriageway resurfacing were completed on both sides of the bridge on 3 February 2022.

With 95 per cent of the works now complete, the remaining works are to install footway bollards on three corners of the bridge. These works were delayed because of shallow utilities in the footways requiring bespoke design and engagement with the owners of the services to agree the design. Designs are now complete, bollards and foundation plates have been ordered and the works are planned to be completed by July 2022.

Rotherhithe Tunnel

The design work and preparation of tender documents for the detailed design and build procurement stages of the project is now complete. However, owing to the current funding and financing challenges the organisation faces, the tendering process for the detailed design and build stage remains paused. A series of short-term capital interventions are being put in place to ensure the tunnel remains safe and operable until the main refurbishment project can be progressed. The installation of an over-height barrier to improve compliance of vehicles with the current temporary safety restrictions (that limit vehicles to no more than two metres in height and width) was completed by 12 April 2022.

Hammersmith Bridge

The stabilisation works, which involve replacing the seized bearings and repairing the fractures in the bridge pedestals, began on 22 March 2022 and are expected to be completed later this year in October. These works will make the bridge safe and ensure its continued use by pedestrians and cyclists. The stabilisation works are being delivered by the London Borough of Hammersmith & Fulham as the bridge owner, with the cost of £8.8m being shared equally between us, the borough and the Department of Transport (DfT). The subsequent stage of works, known as strengthening, will be required to enable the bridge to be re-opened to buses and general traffic. The London Borough of

Hammersmith & Fulham have appointed Foster COWI to develop a concept design for the strengthening works, which are expected to be finished in the autumn. A Memorandum of Understanding between the borough, the DfT and us is expected from the DfT, setting out the arrangements for how the strengthening works will be funded.

Carriageway renewal

We delivered more than 350,000 metres squared of essential carriageway renewal works by the end of 2021/22. These were locations where the current poor condition of the carriageway had the potential to impact on safety of users, reliability, performance and increased whole life costs if not treated. Over the course of the year, 27 schemes were delivered, with substantial schemes taking place on the A4 Great West Road, A21 Bromley Road and A24 London Road. This output represents tremendous performance and teamwork across TfL and our supply chain.

Public transport

Reporting period	Cost to date (£m)	Cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	130	343	473	249	(224)
Change since last Investment programme report					
No change	15	6	21	No change	

Financial commentary

The public transport portfolio is forecasting an increase in gross expenditure of £21m this quarter.

The latest forecast reflects a prioritisation review of the renewals assets programme, following the impacts of the managed decline scenario. This has driven an increase of £23m to ensure essential investment to meet operational requirements within the funding constraints. This is increased by higher cost estimates for East London Line Housing Infrastructure Fund, which is funded by the Department for Levelling up, Housing and Communities and offset by slippage across additional programmes into future years.

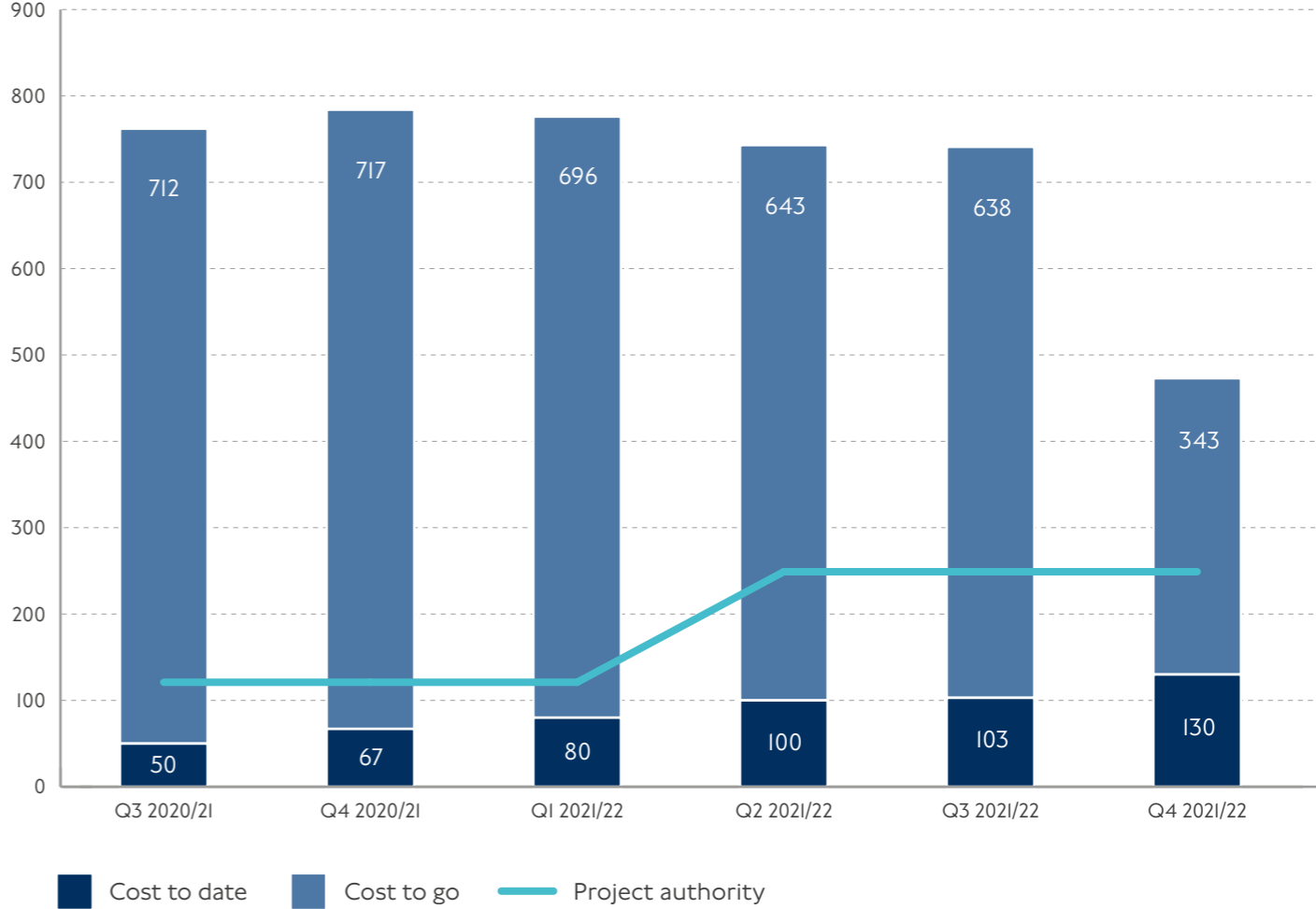
The five-year view also reflects an increased funding request for completion and handover of London Overground projects to Network Rail and Trams project, Sandilands.

Performance over time

Over the last six financial quarters, our forecast cost has fluctuated, driven by funding challenges following the recent pandemic which have resulted in a number of pipeline enhancement projects that have been put on hold as we moved to a managed decline scenario.

Our programme and project authority was increased at the July 2021 Programmes and Investment Committee meeting. This includes all spend up to the end of 2022/23.

Estimated final cost performance over time (£m)





We are working on infrastructure projects in East London

Programme update

London Overground

We have continued to develop concept designs as part of our enhancements programme in East London for infrastructure projects associated with significant housing growth that are funded by both the Housing Infrastructure Fund and developer contributions. The concept designs were completed in spring 2022. The programme is working with the Department for Levelling Up, Homes and Communities to agree a two-phase approach to the delivery of the programme.

Class 710 trains

50 of the 54 Class 710 trains have been delivered by manufacturer Alstom and accepted into use by London Overground. The last four trains, two of which are being used by Alstom for further train software development, are expected to be delivered between Quarter 1 and Quarter 3 2022/23.

DLR

Both construction and procurement activities for the renewal portfolio continue to gather pace. The team, including our contractors, continue to assess the impact of the price rises and availability of materials and resources.

The replacement bogie frame project for the B92 train type is progressing well, with the majority of frames delivered.

High voltage projects have been designed and equipment purchased for renewals at Custom House, Royal Mint Street, Bow Church and Beckton.

Good progress has been made on the Poplar and West India Quay station lighting upgrade projects. Migration and final commissioning works are in progress.

Automated people counter installation has been completed at all planned stations, as well as intrusive lighting and power surveys, which has been completed at several stations, with technical documentation complete and ready for tender.

The lift system upgrade project continued to make good progress, with all planned lifts completed for the financial year. Following a successful tender process, a contract has been awarded for escalator mid-life overhaul work across 20 DLR stations, along with a lift renewal project for 26 lifts.

Custom House escalators are now being commissioned into service, and works have started on site to refurbish London City Airport and Cutty Sark escalators.

Coper, tactile and paving installation has been completed at London City Airport, as well as Bank and Shadwell stations, completing our DfT obligation for Rail Vehicle Access Regulations compliance. The third phase of works have begun at Limehouse Arches, and early engagement with the Canal & River Trust has meant we have secured our licence to work.

We have completed 800 metres of rail at Royal Mint Street and Stratford, and track fixings mean that we have continued to upgrade the baseplates through critical sites during engineering hours.

The GLA-funded Royal Docks stations programme has had its next phase of development approved by the GLA for Royal Victoria, Pontoon Dock and the proposed new station at Thames Wharf.

London Trams

Our rolling stock replacement programme will replace the life-expired Bombardier CR4000 trams, which are experiencing declining reliability and have one of the lowest states of good repair categorisations across our fleets. The programme has been assessing the outputs from the Sandilands inquest and has fed these into the current tram market study to understand safety innovations available for modern fleets.

The market study, plus assessments of the current depot and infrastructure, will complete in the autumn ahead of starting the market engagement exercise in Quarter 4.

Installation work for both the wayside and on-tram upgrades to tram communication equipment was paused in December 2021 so that the project team can investigate and rectify an increase in the number of communication faults, which are affecting the reliability of tram operations. This work is a precursor to enabling a correct-side door enable system on the Bombardier CR4000 trams. The next milestone is to complete the wayside installation works, which is now expected in September 2022.

Our renewals programme continues across five asset groups, including rolling stock, power, civils, systems and permanent way infrastructure. The final phase of the Reeves Corner embedded track renewal was completed as planned during a nine-day part closure of the tramway from 12 to 20 February 2022. Detailed delivery planning was also concluded for the first phase of the Mitcham-to-Mitcham Junction ballasted track renewal works, scheduled to be delivered during a ten-day part closure of the tramway from 4 to 13 April 2022.

Following contract award in December 2021, the contractor started mobilising to replace the retaining wall and step-free access ramp at Birkbeck tram stop, and site works started on 11 April 2022.

The first phase (condition assessment and underframe crack investigations) for Tram 2547 (Bombardier type tram) was completed by Alstom. The recommendation to proceed with the second phase (replace underframe and return tram to service) was accepted and authorisation granted for Alstom to begin.

Approval was also granted to start the planned works in May 2022 to replace fire doors at the London Trams depot and ensure compliance with current fire safety standards. The tender process to refurbish key components of the CR4000 Bombardier tram fleet (flooring, doors and rooftop) was initiated in March 2022, with the contract award scheduled for summer 2022.

Santander Cycles

Our Santander Cycles scheme continues to go from strength to strength and has seen seven months of record usage. From September 2021 to March 2022 we saw a record number of hires per month compared to any previous equivalent month. The financial year 2021/22 saw 11.8m hires, an eight per cent increase on the previous best from 2018/19.

Since March 2020, we offered free cycle-hire access codes to NHS staff and other key workers. The free key worker promotional code ended in March 2022 following more than 25,000 redemptions. We continue to offer a free code to NHS staff, and it has been redeemed almost 150,000 times since March 2020.

The programme to modernise and electrify the Santander Cycles scheme continues as planned and aims to broaden and increase the usage of Santander Cycles bikes. It will also help support our financial sustainability plan and will improve the customer offering with the rollout of 500 e-bikes, and enhanced app functionality. Delivery is on track, with the launch of the 500 e-bikes planned for summer 2022 and further phases of improvements to follow.

The London Borough of Southwark has provided third-party funding to expand cycle hire within the borough, with design work and planning applications under way for the potential sites identified. We also continue to explore options to further expand the geographical footprint of Santander Cycles in London.

Woolwich Ferry (London River Services)

The Woolwich Ferry resilience and renewals programme falls under London River Services as part of the public transport portfolio. The current programme is made up of schemes across varied disciplines which are currently across various stages of the project delivery life cycle. The key aim of these schemes is to reduce operating expenses, maximising the use of the assets and exploiting opportunities to generate additional revenue where possible. Projects in the resilience and renewals work bank will support the delivery of the overall project objectives, in particular reducing cost, improving safety and making services more reliable.

Currently the key focus is to establish a clear prioritisation across the numerous schemes and agree an effective delivery strategy for each with all team members.

Technology

Reporting period	Gross cost to date (£m)	Gross cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2020/21 to 2024/25	50	191	241	158	(83)
Change since last Investment programme report					
No change	8	(8)	No change	No change	

Financial commentary

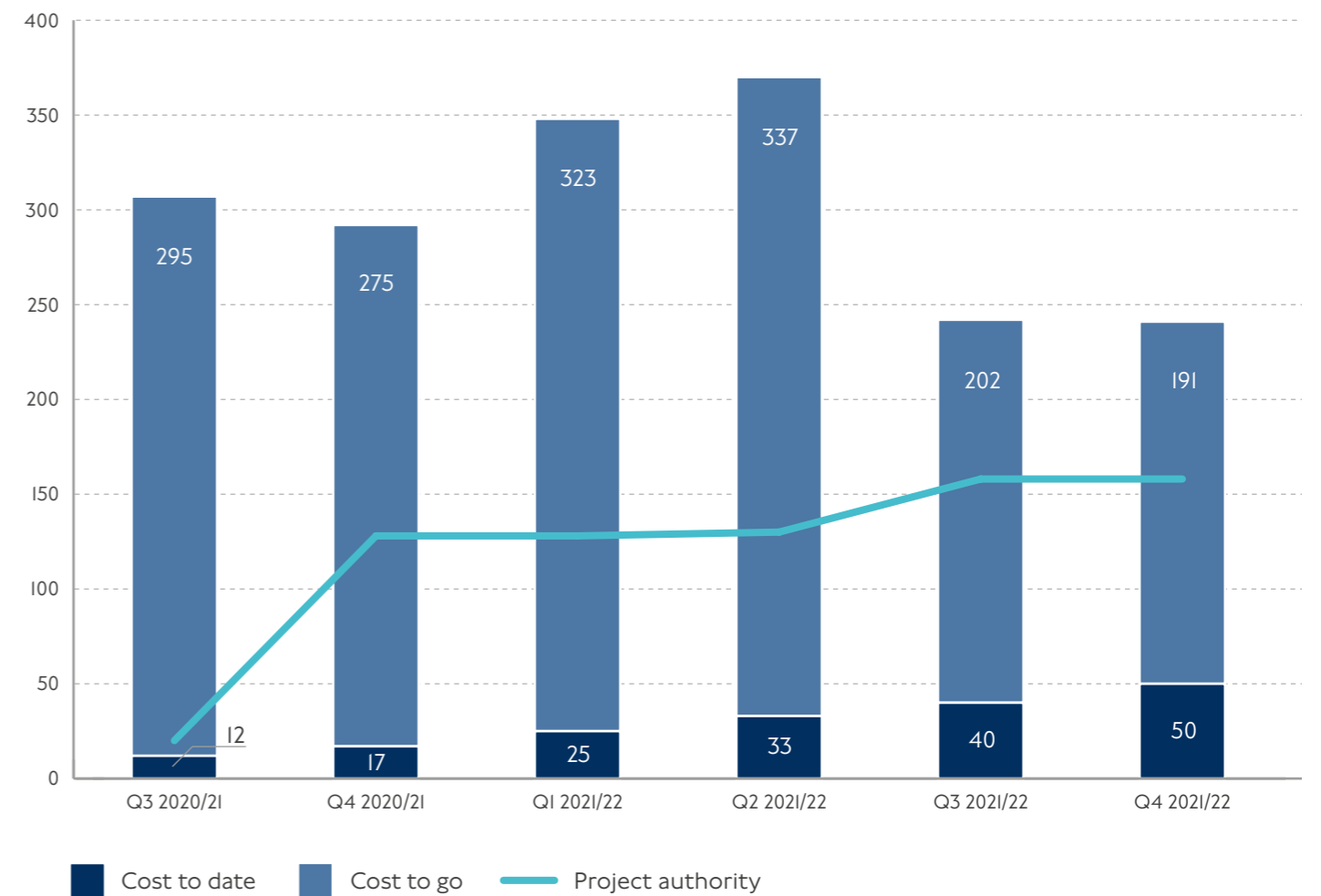
The five-year forecast cost for 2020/21 to 2024/25 remains unchanged since the last report.

Performance over time

The managed decline scenario accounts for a £96m reduction, where a lower level of funding is available for renewal projects, and a significantly lower level for enhancement projects. The team have also delivered cost reductions of £17m and a rephasing of the iBus2 project.

The next submission to the Programmes and Investment Committee will be made this July and will cover the requirements for 2022/23 and the future year's commitments, which we'll be making this year.

Estimated final cost performance over time (£m)



Programme update

Compliance, enforcement and safety technology

We are continuing to progress the roll-out of deployable enforcement cameras, which will play a vital part in helping us meet our Vision Zero goal of eliminating death and serious injury on the road network by 2041. A trial of cameras carried out in 2020 saw an improvement in compliance of up to 60 per cent in six months. Following the installation of 24 cameras on the network by 31 March, a further 21 were installed by 28 April.

After completion of the subsequent testing and final camera installations at the end of May, 50 of the installations are now operational. We will be closely monitoring how successful they are at reducing road danger and congestion, and improving bus journey reliability. Any money we recover from penalty charge notices will be reinvested into maintaining a safe and efficient road network for everyone travelling in the capital. The cameras are used for enforcement of civil traffic rules only and are fully compliant with data protection legislation. Subject to a review of the success of these cameras in improving safety and compliance on London's roads, we will be looking at the feasibility of further extending the use of these cameras across London.

We are continuing to develop and refresh enforcement and compliance back-office systems using in-house teams for a variety of projects. These projects will enable us to replace and improve digital capability, which underpins operations in our Compliance, Policing, Operations and Security directorate, enabling

officers to record contraventions through mobile devices on the street, replacement data storage and reporting solutions, and delivering a case management solution to enforce regulations through prosecutions and advisory notices. These projects are at various levels of mobilisation and delivery.

We began a surface workforce management project in April 2021 to renew our existing systems for managing our operational staff and ensuring we are deploying them in the most effective way. We are working closely on a similar project, focusing on workforce management of London Underground staff to deliver benefits, opportunities and savings across TfL and align with our wider enterprise resource planning improvements.

Road technology

Many new road management systems are delivered within the Surface Intelligent Transport Systems (SITS) programme and enable a multi-modal approach to managing the road network. All road users will benefit from the efficiencies gained by this programme, including those who are walking, cycling, on a bus, in the freight industry or part of emergency services. The programme remains on track to deliver several vital systems.

Work continues on the predictive element of the SITS programme. This aims to revolutionise our approach to managing small to medium-impact incidents.

It will enable us to respond to incidents quicker, using innovative modelling technology. This element alone could reduce the cost of delay to people travelling in London by up to £0.4bn over

the next 15 years, about one-third of the overall benefits of the SITS programme. Work is continuing to provide a baseline for the scope, assuring the business case, benefits and proposed route to market. This enhancement is not funded in our budget, which would reduce value for money from the funded renewals elements of the SITS programme. Review of funding and prioritisation of enhancements is ongoing. This project will be paused in 2022/23 pending funding decisions.

The real-time optimiser will replace the legacy urban traffic control system and will optimise signal timings at almost 6,000 signal-controlled junctions in London. The Common Operational View Incident Management System will replace the legacy Traffic Incident Management System and provide a real-time common view to operators in the Network Management Control Centre of how the road network is operating. The fifth release took place on 27 April, to add roadwork information across London and additional mapping layers, further increasing the situational awareness for our control centre to better assess the impacts of an incident across different modes and deploy effective management strategies.

The London Driver Information Service was finally retired on 31 March. It was the control system for the 134 variable messaging signs on the London network, and used a bespoke system language that was created by our engineers. This project has successfully migrated these signs onto a new control system that uses 4G, which provides a more reliable service and enables the Network Management Control Centre to provide the services needed to

Keep London Moving and relay safety-critical messages to our customers.

Public transport technology

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

Bidders who were successful in the earlier selection questionnaire phase have now submitted their proposals, and the team have carried out an evaluation of the responses. Shortlisting has been carried out and the preferred bidders have progressed through to the competitive dialogue phase, which started on 31 May 2022. This phase will enable the project team to clarify with bidders their technical and commercial proposals to ensure that any final proposal submitted at Invitation to Submit Final Tender represents the best value for money.

Procurement is progressing for a replacement booking and scheduling system for Dial-a-Ride, which will give passengers the option to book online, and enable us to deliver more trips with the same number of vehicles. A further round of negotiation is under way to hone understanding of value for money. Shortlisted bidders were invited to submit final tender on 13 April, with contracts expected to be awarded in September 2022.

Professional services

This comprises Technology and data as well as the TfL Growth fund



Technology and data

Reporting period	Gross cost to date (£m)	Gross cost to go (£m)	Forecast cost (£m)	Programme and project authority (£m)	Variance: Forecast vs authority (£m)
2019/20 to 2022/23	210	108	318	320	2
Change since last Investment programme report					
No change	25	(33)	(8)	No change	

Financial commentary

The programme and project authority and EFC shown are for financial years 2019/20 to 2022/23, as per the Programmes and Investment Committee paper that was approved on 6 March 2021.

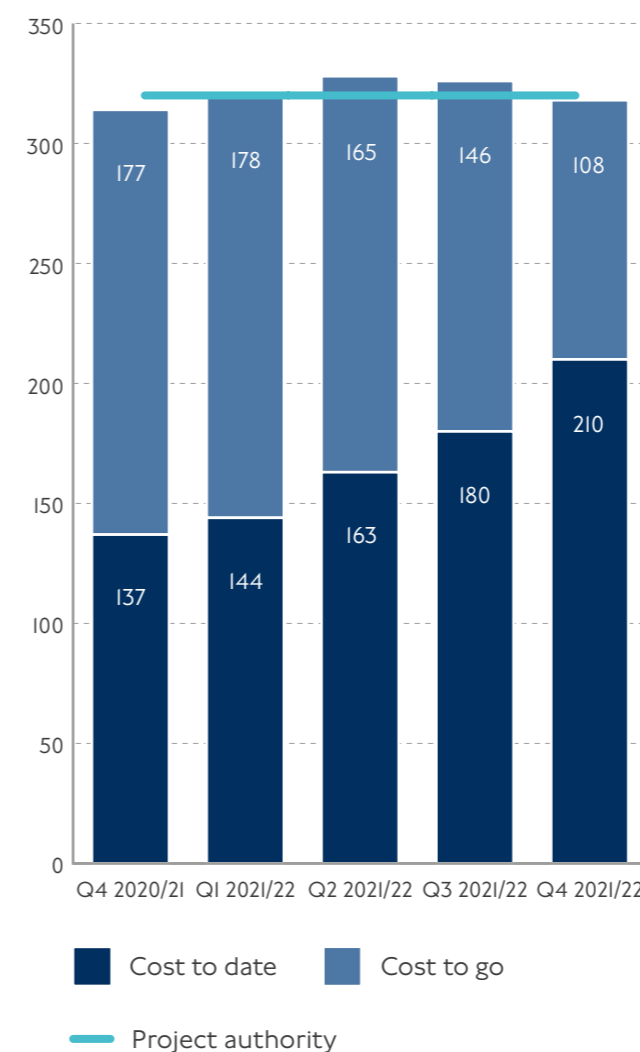
The values are for Technology and data funded projects only and exclude the Emergency Services Network, the public cellular network and telecoms commercialisation projects. Other telecoms spend is included from 2021/22 as it was included within the latest Programmes and Investment Committee approval.

The movement in EFC since the last report is due to savings and deferrals out of the period on projects related to payments, cyber, network, hosting and the digital workplace.

Performance over time

Over the last five quarters, forecast spend increased due to income for telecoms being transferred out of this portfolio. Reductions in recent quarters reflect savings and deferrals out of the period on the projects outlined in this section.

Estimated final cost performance over time (£m)



Progress update

Payments

We have signed an agreement with the DfT to begin the delivery of Project Oval. This will expand contactless payments to more than 200 stations across South East England.

The final payments systems (contactless back office and website, and cycle hire) were upgraded to handle the new stronger customer authentication standards required by the payments industry by 14 March.

Digital workplace

The consolidation of all legacy versions of Microsoft SharePoint sites into SharePoint online has now been completed. This addresses the security, compliance and obsolescence issues associated with this legacy infrastructure. It also ensures that we can maximise our investment in Microsoft Office365 technology with an improved security, accessibility and information governance position.

We have successfully migrated our fixed-line telephony services from legacy ISDN technology to a new SIP-based solution. This work, which included the transfer of more than 30,000 telephone numbers, is a significant milestone in the ongoing upgrade of our core telephony systems and removes our reliance on legacy technology (ISDN), that will be obsolete in 2025.

We have completed the third phase of our meeting room upgrade project, which has provided 50 operational locations with Microsoft Teams-based video conferencing equipment. This will further enable and support hybrid and collaborative working across TfL and follows on from the successful deployment of the same technology in the meeting rooms across our three hub buildings.

Hosting

Our programme to refresh end-of-life infrastructure in order to ensure the ongoing availability and security of our systems continues to progress well. A total of 5,743 out of 6,313 (91 per cent) servers hosting line of business application services have now been rehosted on a modern hardware platform.

A total of 75 out of 375 (20 per cent) mission and business critical application services which were operating on legacy end-of-life operating systems and database platforms have been re-platformed on a modern supportable platform.

Networks

The first milestone of the telecoms commercialisation project has been achieved, with the Jubilee line public cellular network pilot smoothly transferring to BAI, our telecoms concessionaire over the weekend of 12 to 13 March.

Achievement of this milestone completes the first of our planned commercial mobile service deliveries on the Underground and will enable all mobile network customers to continue to check the latest travel information, keep on top of their emails,

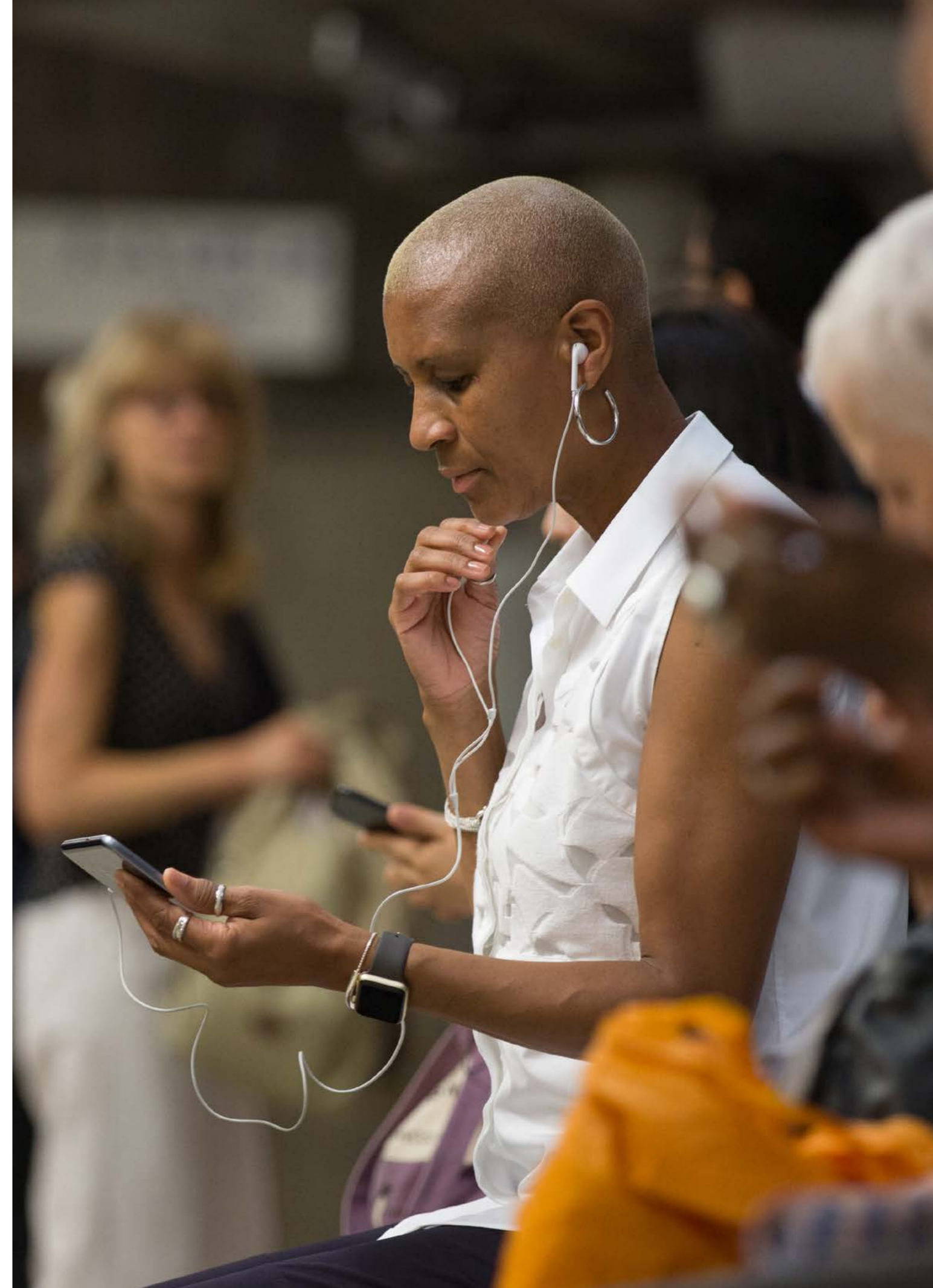
catch up on social media and live stream videos wherever they are on this section of the Jubilee line.

Looking ahead to the delivery of mobile services elsewhere on the Underground, Technology and data continue to work collaboratively with BAI and other internal TfL functions such as engineering, Safety, Health and Environment and Major projects construction in the rollout of station and tunnel infrastructure. Equipment has been purchased ready for installation to avoid supply chain and logistics issues, designs are being delivered and station works are under way in 17 stations.

Our project to install infrastructure within the Underground in support of the Home Office's emergency services network project is complete. We have now handed this infrastructure (approximately 470km of leaky feeder and 410km of fibre optic) over to BAI to complete the build of the service.

The Connect programme continues to replace London Underground's operational radio base stations. This two-year project has now replaced more than 100 of 293 (34 per cent) base stations. Our planned update to the core radio software was successfully completed in February 2022, bringing this operationally critical system in line with currently supported software versions.

Our project to replace the end-of-life data network services that underpin virtually all Surface services continues to progress according to plan. To date, we have migrated 1,207 of 4,496 (27 per cent) sites on to the new network delivered by Capita.



The Jubilee line provides 4G mobile service for our customers

Technical service operation

We are progressing with several projects to assess suitability of on-premise and cloud network infrastructure, and where necessary replace it. This will support and protect our business-critical services.

Other key projects relate to software license management. For the setup of a software asset management provider service, we have decided to revisit our requirements to ensure we secure the service we need. We intend to go out to market once that activity is complete. The initiative to optimise Java license usage is nearing completion, which will also put processes in place that enable this to continue long term.

Following approval by the GLA Collaboration Board, we are also progressing with the implementation phase of the GLA IT Shared Service project, which will see us take on responsibility for agreed GLA IT services over the next two years.

Enterprise resource planning

Preparation for a new core HR solution extending the myJourney SAP SuccessFactors platform continues. A market engagement prior information notice has been issued to potential implementation partners with a view to contracting a partner by Quarter 2 2022. Also, the new procurement and supply chain system is entering the testing phases for the Sourcing and Contracting

functions used by our Procurement and Commercial team and testing for the new digital catalogue and purchasing system (SAP Ariba) starts in July. We aim to have the new purchasing system live by the end of 2022. Communication and change management activities are ramping up now to promote this.

The Elizabeth line is now on TrackerNet

On 15 March, we took another step towards opening the Elizabeth line, with the release of an update to TrackerNet.

TrackerNet is London Underground's system for visualising train movement in real-time and is a key tool in control centres and for front-line staff, both for managing train operations and providing good customer information. Following the release, you'll now be able to see train movement across the Elizabeth line Central Operating Section, with a further release planned for the whole line in the autumn. It means that our frontline staff will continue to provide a seamless customer experience across the network, with a plan for it to be available to both London Underground and MTR (our station operator) staff. The development and delivery were the result of much hard work across Technology and data, with strong collaboration during the project with our colleagues in London Underground and MTR. The release has been well received by stakeholders across the business.

Contact Centre operations

We continue to focus on maintaining the quality and efficiency of our Contact Centre services. Following the retender, transition and go live of our new consolidated Oyster customer support contracts in July, we've successfully navigated our cycle hire services through the same processes to ensure we continue to provide a seamless transition to a new, continued cost-effective contract. This went live at the beginning of May.

In addition to ensuring a continuation of these business critical and cost-efficient contract services, we've also been introducing new automated rules to quickly and more efficiently manage our contactless payment card contact handling. Following a proof of concept we developed within Technology and data in 2019, we've fine-tuned and implemented rules that identify customers' journey information and what refund they're due when they contact us, so that the system automatically processes the contact handling and refund. Customers will receive quicker responses to their requests and refunds, which also decreases our cost by more than £800,000 per annum as we no longer need to pay our contact centre suppliers to manually complete the refunds.

Data analytics

During this period, our primary area of focus has been the critical asset refresh of our key data platform, which is known as CLEO. This legacy data platform requires a refresh to meet the size and performance demands of our data products that we provide to colleagues across the organisation. Our 'CLEO to the Cloud' project has been structured with an initial proof of concept stage to ensure that the development of our new solution is fit for purpose. This stage has now finished, confirming that we will indeed plan to migrate our Enterprise Data Warehouse from the ageing on-premises infrastructure to cloud architecture. We are now in the evaluation phase, which will lead into solution design and the definition of our implementation roadmap.

A key risk to the data analytics portfolio of work is resource retention in key roles across our delivery teams. This will likely impact us from a delivery capacity perspective, but also the loss of retained knowledge in the team and the time it will take to hire and train replacement staff.

Digital

More than 1.1 million customers have downloaded the TfL Go app since it was launched in 2020.

In April, we added widgets to the app so that customers can easily see when there is disruption to Tube, DLR, tram and TfL Rail lines. We continue to develop account, journey history and payment card functionality with a first phase beta release now planned for July 2022. We ensured that the app was ready for the recent successful launch of the Elizabeth line to customers on 24 May.



The popular TfL Go app provides real-time service information

Growth Fund

Reporting period	Forecast £m
2020/21 to 2029/30	2
Change since last Investment programme report	
No change	No change

Financial commentary

The forecast has been rounded up to £2m, however, there has been a decrease of £0.6m due to a reduction in the requirement for funding for the project at Tolworth roundabout, which is owing to a reduction in costs.

Programme update

The current revised budget classifies all Growth Fund schemes as fully meeting the Mayoral objectives but contingent on additional funding. This means that, although all projects have already secured a strong commitment and a significant degree of third-party funding, a further commitment by the Government or other third-party sources is needed to complete the funding packages.

We continue to identify additional funding streams, while supporting all Growth Fund projects with contractual obligations and other urgent milestones by providing case-making and programme-level support.

The changes at Tolworth roundabout in the Royal Borough of Kingston will mitigate the predicted increase in bus journey times resulting from increased traffic from the adjacent developments in the area. One of the two key changes includes a new shared area for walking and cycling in the centre of Kingston Road by extending the existing 'Greenway' in Tolworth Broadway. People walking and cycling will be able to access the path from an upgraded pedestrian crossing connecting through to Tolworth Roundabout. Other key changes include a new left turn to access the A3, new developments from the Kingston Road, and remarking of traffic lanes on the approach and around the junction to allow for better lane discipline and improved traffic flow. Over the last two quarters the project has secured the required land and started detailed design, which means that our spend forecast has been reduced by £0.6m to reflect that we have more certainty on the estimated final cost.

Challenges

The main challenges continue to centre around ongoing funding uncertainty for Growth Fund projects, which are necessary to unlock new homes and jobs in areas of high need in London. Several projects with previously complete funding packages are currently at risk due to the programme being contingent on additional funding.

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

About Transport for London (TfL)

Part of the Greater London Authority family led by Mayor of London Sadiq Khan, we are the integrated transport authority responsible for delivering the Mayor's aims for transport. We have a key role in shaping what life is like in London, helping to realise the Mayor's vision for a 'City for All Londoners' and helping to create a safer, fairer, greener, healthier and more prosperous city. The Mayor's Transport Strategy sets a target for 80 per cent of all journeys to be made by walking, cycling or using public transport by 2041. To make this a reality, we prioritise sustainability, health and the quality of people's experience in everything we do.

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

We manage the city's red route strategic roads and, through collaboration with the London boroughs, we are helping to shape the character of all London's streets. These are the places where Londoners travel, work, shop and socialise. Making them places for people to walk, cycle and spend time will reduce car dependency, improve air quality, revitalise town centres, boost businesses and connect communities. As part of this, our expanded Ultra Low Emission Zone and fleets of increasingly environmentally friendly and zero-emission buses are helping to tackle London's toxic air.

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

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

Working with Government, we completed the Elizabeth line in time for Her Majesty the Queen's Jubilee. This transformational new railway adds 10 per cent to central London's rail capacity and supports the delivery of high-density, mixed-use developments, which are planned around active and sustainable travel to ensure London's growth is good growth. We also use our own land to provide thousands of new affordable homes and our own supply chain creates tens of thousands of jobs and apprenticeships across the country.

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

We are constantly working to improve the city for everyone. This means using intel, data and technology to make services intuitive and easy to use and doing all we can to make streets and transport services accessible to all. We reinvest every penny of our income to continually improve transport networks for the people who use them every day. None of this would be possible without the support of boroughs, communities and other partners who we work with to improve our services. By working together, we can create a better city as London's recovery from the pandemic continues.

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Programmes and Investment Committee



Date: 20 July 2022

Item: Independent Investment Programme Advisory Group
Quarterly Report

This paper will be considered in public

1 Summary

- 1.1. This paper presents the Independent Investment Programme Advisory Group (IIPAG) quarterly report for July 2022. It describes the work undertaken since the last report presented to the Committee in May 2022.
- 1.2. A paper is included on Part 2 of the agenda which contains exempt supplemental information that is exempt from publication by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendation

- 2.1 **The Committee is asked to note the Independent Investment Programme Advisory Group's quarterly report, the management response set out below and the exempt supplementary information on Part 2 of the agenda.**

3 IIPAG Quarterly Report

- 3.1 Under its Terms of Reference, IIPAG is required to produce quarterly reports of its advice on strategic and systemic issues, logs of progress on actions and recommendations and the effectiveness of the first and second lines of project and programme assurance. IIPAG's quarterly report for July 2022 is included as Appendix 1 to this paper.

4 Management Response to IIPAG Quarterly Report

Key Performance Indicators for Renewals Projects

- 4.1 It is recognised that there are opportunities for improved project, programme and portfolio reporting across renewals programmes to provide consistency with enhancement projects, but also recognising the differences required to provide an accurate picture of the time, cost and quality performance of renewals projects.
- 4.2 We agree with IIPAG's recommendation to consider key performance indicators. Relevant metrics to be tracked are currently under review to ensure a common approach is taken. This is an area the TfL Programme Management Office is currently reviewing across all reporting to enable the right information to be in the right place to enable the right decisions to be made.

Asset Information in TfL – Part 2: Asset Data and Asset Management

- 4.3 We welcome IIPAG's report on Asset Information in TfL. Work is underway to address a number of known data gaps and a prioritised list of data needs has been developed. The priority list will be refined to feed into funding prioritisation to be undertaken in October 2022. It is recognised that it will take several years to fully close all data gaps, however this prioritised approach will, subject to funding, enable critical data gaps to be closed more rapidly.
- 4.4 A strategy and plan are in place to develop, and continually refine, modelling capability for all asset types. The first suite of validated models for all assets are due in September 2022.
- 4.5 We have a target to have asset management competences defined and asset management training active by the end of the 2022/23 financial year. In addition, there will be competence activities specific to asset data and asset information, including defining a common approach to data roles and responsibilities for TfL asset data, which will align to recognised good industry practice. We are also developing a programme that includes a people development workstream with the aim of developing the digital skills and capabilities of TfL staff.

List of appendices to this report:

Appendix 1: Independent Investment Programme Advisory Group –
Quarterly Report July 2022

Exempt supplementary information is included in a paper on Part 2 of the agenda.

List of Background Papers:

None

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Independent Investment Programme Advisory Group – Quarterly Report July 2022

1. Introduction

1.1. This report to the committee describes IIPAG's activities in May-June 2022. We have made one new strategic recommendation, that a set of Key Performance Indicators should be developed for renewals programmes. We also report the findings of the second part of our cross-cutting review of Asset Information.

2. IIPAG activity

2.1. We have undertaken the following sub-programme and project reviews in preparation for the committee in July:

- Surface Technology
- London Underground (LU) Renewals
- Public Transport
- East London Line Housing Infrastructure Fund (HIF)
- Road User Charging

2.2. We continue to engage in continuous assurance of the Four Lines Modernisation (4LM) programme. We were also asked by the Chair of the committee to look at a recently reported cost pressure on the Old Street project. Part 2 summarises the key points from these reviews. We also undertook a review of the Central Line Improvement Programme which is being considered through Executive governance. The accompanying paper from Project Assurance (PA) describes management progress in implementing IIPAG's recommendations from sub-programme and project reviews.

2.3. We have undertaken several reviews of renewals programmes recently – LU Renewals and Public Transport in this period, and Surface Assets for the committee in May. For all of these sub programmes we have observed some difficulty in getting a good picture of performance. These are multi-year programmes consisting of a large number of small projects. The programme Estimated Financial Costs (EFCs) change as the years covered change, and the composition of annual spend changes, with most programmes reporting slippage. EFCs therefore do not provide a clear picture of cost performance. Similarly, while certain milestones are tracked, they do not give a full picture of schedule performance across the programmes.

2.4. We are therefore recommending that a set of Key Performance Indicators should be developed for renewals programmes. Performance against these metrics would be reported to the committee and other governance bodies. They could also help

teams to understand their performance better and to target improvements. Metrics might include for example:

- The % of projects that are delivered within their original estimated cost/original estimate +10% etc
- The % of projects delivered on time/3 months early or late etc
- Unit costs
- Metrics representing quality/outputs compared with forecast

2.5. Whilst some tailoring of metrics to particular types of assets may be necessary, there would be advantage in having a common approach with common metrics as far as possible, to allow comparisons across programmes.

3. Progress with Cross-cutting Work

3.1. We have completed two cross-cutting reports, which are summarised below.

3.2. Asset Information Part 2

In May we completed the second part of a cross cutting study into asset information and asset management within TfL, covering the quality of the asset data available and its completeness. We found that there are significant variations across TfL in the quality of core asset data, such as inventory and condition. In LU only six out of thirteen asset categories are considered to have high quality and easily accessible core data, and of those two are high quality only in part. The picture for Surface assets is better, since good quality core data exists for their key highways assets such as carriageways and structures, although gaps also exist in other more minor asset categories. Work is underway to rectify these gaps in data and this should be a priority, since without good quality core asset data other 'higher order' asset management processes are impossible.

3.3. Capability for asset modelling is very limited in TfL and we think this is an area in which investment is urgently required. This would enhance TfL's ability to demonstrate a robust case for renewals funding.

3.4. The amalgamation of the Asset Strategy teams in Surface and LU and its subsequent reorganisation under the Capital business stream has been a positive development; improvements and a clear sense of direction are showing through. Management of assets across TfL depends on the effectiveness of the 'Guiding Mind' – the collaborative process involving Asset Strategy, Asset Operations and Engineering. Improving asset management competencies across the three disciplines forming the Guiding Mind would help to increase its effectiveness.

3.5. Since the committee meeting in May we have also completed our update review of the Procurement and Commercial Improvement Programme (PCIP). The IIPAG report was considered at the June 2022 meeting of the Audit and Assurance Committee.

3.6. We are currently preparing for our regular reviews of TfL Benchmarking and First and Second Lines of Defence.

Alison Munro
Chair, IIPAG
June 2022

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Programmes and Investment Committee

Date: 20 July 2022

Item: TfL Project Assurance Update



This paper will be considered in public

1 Summary

- 1.1 This paper provides an update on the project assurance work undertaken during Quarter 1 of 2022/23 (1 April to 25 June 2022). Four programme reviews were undertaken during this time, with the Independent Investment Programme Advisory Group (IIPAG) involved in three of them. In the same timeframe 12 project assurance reviews were undertaken, with IIPAG involved in four of these.
- 1.2 These reviews gave rise to a total of 63 recommendations being made, of which two were considered to be critical issues. Critical issues are those that the TfL Project Assurance team or IIPAG believe should be addressed before projects proceed to the next stage.
- 1.3 A paper is included on Part 2 of the agenda which contains exempt supplemental information that is exempt from publication by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and the exempt supplementary information on Part 2 of the agenda.**

3 Background

- 3.1 The TfL Project Assurance update provides the Committee with a summary of the second line assurance, provided by TfL's Project Assurance team, and third line assurance, provided by IIPAG.

4 Summary of Project Assurance Activity

- 4.1 From the reviews undertaken, a total of 50 recommendations were made by TfL Project Assurance. These consisted of 48 general recommendations and two critical issues, all of these being agreed with the project teams concerned.
- 4.2 IIPAG made 13 general recommendations with all agreed with the respective project teams and raised no critical issues.
- 4.3 The following graphs show the number of open recommendations, the number that are overdue, and the number closed in the last three quarters. The overdue recommendations include one overdue critical issue. This critical issue relates to the Central line Signalling and Control Life Extension project and the need to ensure that

the business case demonstrates value for money for all elements of the scope. There are no overdue IIPAG critical issues.

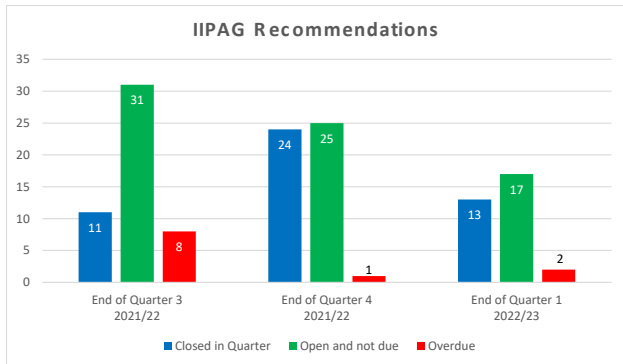


Figure 1: IIPAG Recommendations

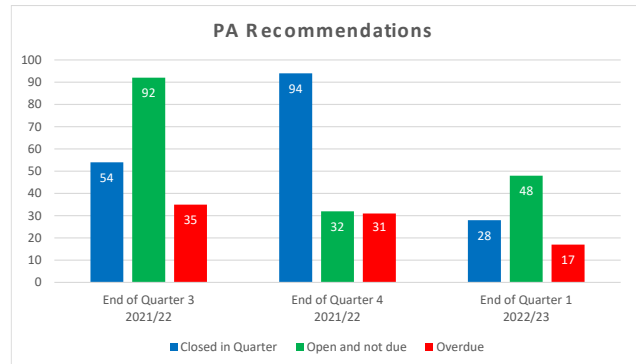


Figure 2: Project Assurance Recommendations

4.4 The following graph shows the length of time that the overdue recommendations have been overdue by. The information shows critical issues and general recommendations and the business area that the recommendation relates to (CCO being Chief Capital Officer, COO is Chief Operating Officer, CCSO is Chief Customer and Strategy Officer and CFO is Chief Finance Officer).

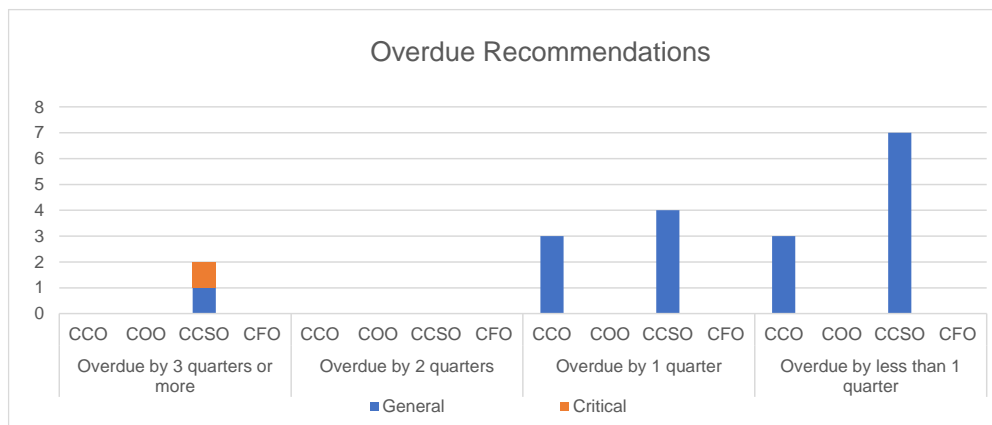


Figure 3: Breakdown of Overdue Recommendations

List of appendices to this paper:

Exempt supplementary information is included in a paper on Part 2 of the agenda.

List of background papers:

None

Contact Officer: Howard Carter, General Counsel

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Date: 20 July 2022

Item: Review of Progress on Value for Money

This paper will be considered in public

1 Summary

- 1.1 This paper sets out an update on our progress to date in developing a comprehensive Value for Money (VfM) programme, designed to complement the extensive cost-saving efforts of the business to achieve financial sustainability by 2023/24. This update is focused on improvements in ‘effectiveness’ – one of the main areas of focus recommended by the Independent Investment Programme Advisory Group (IIPAG) in September 2021.

2 Recommendations

- 2.1 **The Committee is asked to note the paper.**

3 Background

- 3.1 TfL’s VfM framework was established in December 2020 based on principles set down by the National Audit Office (NAO) and consists of four elements (four E’s):
- (a) **Economy:** minimising the cost of resources used or required (inputs) – spending less;
 - (b) **Efficiency:** the relationship between the output from goods or services and the resources to produce them – spending well;
 - (c) **Effectiveness:** the relationship between the intended and actual results of public spending (outcomes) – spending wisely; and
 - (d) **Equity:** the extent to which services are available to and reach all people that they are intended to – spending fairly. Some people may receive differing levels of service for reasons other than differences in their levels of need.

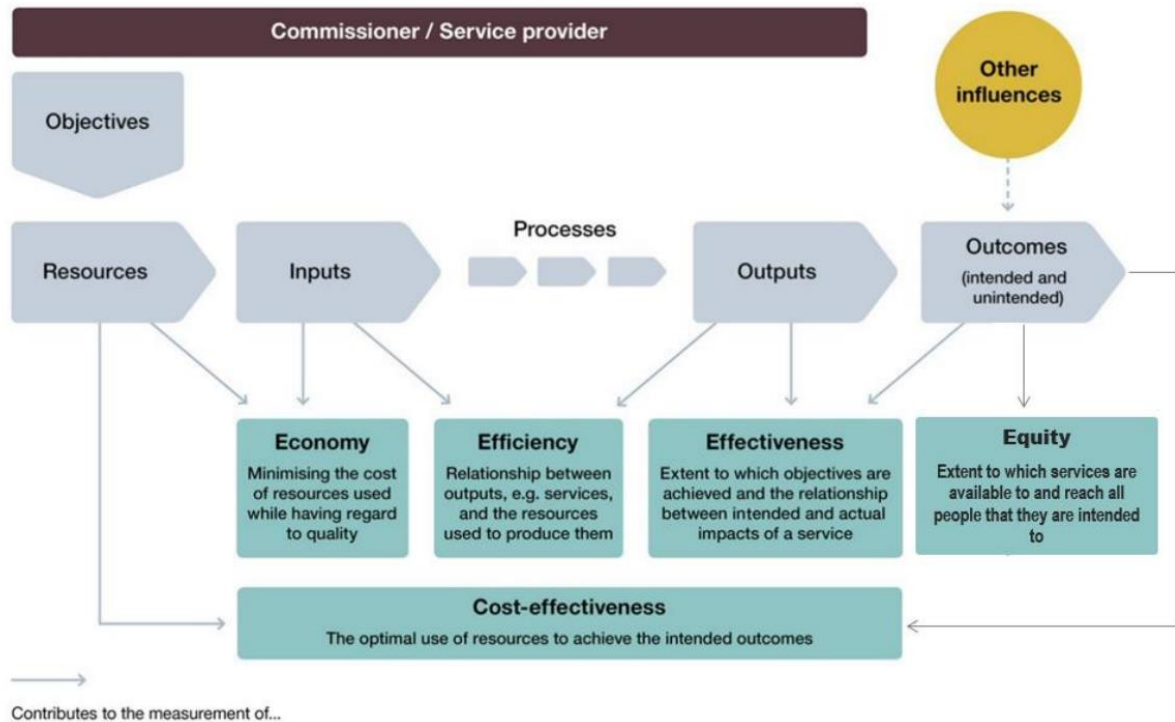


Figure 1: TfL VfM Framework (based on NAO Toolkit)

3.2 In October 2020, IIPAG conducted a review of our organisational approach to VfM and in September 2021 IIPAG produced a report which provided an external view on our progress to date. An update from TfL was subsequently provided to the Committee in October 2021.

4 'Economy' – spending less

4.1 Since the coronavirus pandemic has decimated fare revenue, 'Economy' has been of utmost significance in ensuring we can deliver a balanced budget for 2022/23. In the Financial Sustainability Plan, which TfL produced as a requirement of the funding agreement signed on 31 October 2020, TfL committed to delivering recurring operating cost savings totalling up to £730m between 2019/20 and 2024/25. The cost reduction programme continues across all areas of TfL as it supports the development of a modern, efficient, high-performing organisation. 2022/23 will be the seventh year of the cost reduction programme and will mean TfL has made recurring savings (before inflation and other cost pressures) of around £1,148m by the end of March 2022. This includes a forecast increase in recurring savings of £60.8m in 2021/22.

4.2 To enable TfL to reach a financially sustainable future in light of depressed revenue and uncertainty regarding Government funding, TfL has also substantially reduced the level of capital expenditure proposed for 2022/23, compared to the 2021/22 budget, as we move to a 'managed decline' scenario consequent to funding negotiations with the government. For the years 2023/24 and 2024/25, TfL anticipates being able to balance the budget through the new revenue sources provided by the Mayor, as required by the

Government, but requires significant reductions in capital investment and service levels which will impact the outcomes that TfL can deliver. TfL will continue to develop its financial plans, informed by continued funding discussions with the Government.

- 4.3 Operational savings are being achieved through several programmes. For example, we are consulting on proposals for extensive changes to the central London bus network between 1 June and 7 August 2022. Our plan to achieve the savings required by the Government includes a four per cent reduction in bus kilometres. Bus demand has declined on some routes into central London since 2014. We focused our review on these routes where demand has fallen and where roads are covered by other high-frequency services or are close to alternative stops. The proposed changes being consulted on are designed to meet the savings required by Government, whilst causing as little disruption to passengers as possible and ensuring buses continue to serve areas that need them the most. TfL assesses value for money when considering service changes. Where there are reductions, we calculate the disbenefit to cost saving ratio (rather than benefit to cost ratio).
- 4.4 Other operational savings are being realised through our Procurement and Commercial transformation programme which will also bring wider supply chain savings across the organisation once completed. Further savings aim to be achieved with the roll out of TfL's new Enterprise Resource Planning tool which will make our processes easier, simpler, and better from beginning to end, as well as standardising our processes.
- 4.5 Delivering a cost effective and efficient capital investment programme has been a continued priority for the organisation. This focus predates the coronavirus pandemic when the removal of TfL's operating grant required us to deliver more for less. The collapse in fare revenue over the past two years following the onset of the pandemic has only exacerbated this requirement.

5 'Efficiency' – spending well

- 5.1 Since the update provided to the Committee in October 2021, the financial impact of reduced fare revenue, and the absence of long-term funding certainty have continued to mean most of our activity has centred on affordability rather than long term value for money. Organisational effort has focused on the Capital Efficiency Plan (developed in June 2021, as committed to in the Financial Sustainability Plan, January 2021) and the immediate necessity of reducing spend as far as practicable. Progress on this was charted in our update to the Committee in May 2022. This report recognised the challenge of delivering true value for money in an environment of funding uncertainty. This manifests itself in two main ways:
 - (a) **Long term planning:** It is recognised that certainty in planning and funding creates an environment conducive to efficient investment. The DfT's 2013 paper 'Action on Roads' stated, "Certainty will enable savings of up to 20 per cent on maintenance and improvement work", while 2018 research by the Railways Industry Association stated that 'boom & bust' work profiles cause a 30 per cent increase in the cost of infrastructure.

The Government has acknowledged that the funding certainty afforded to other transport infrastructure operators such as Network Rail and National Highways can enable savings of some 10 to 15 per cent on maintenance and improvement work; and

- (b) **Impact of project / scope reductions:** If TfL has to reduce its forecast capital expenditure then it will limit how much efficiency can be delivered. In the simplest terms, the same percentage efficiency will deliver a lower financial saving if the capital programme is smaller. However, the impact is likely to be greater than that. Efficiencies will disproportionately target expenditure that is less committed or at an early stage of the lifecycle, as this is where the opportunity lies. However, these are also the areas of the capital programme that are more likely to be removed or de-scoped due an overall reduction in capital funding.

- 5.2 While the aforementioned Capital Efficiency Plan has naturally focussed on economy and efficiency, work on improving our effectiveness and an equitable approach has continued as far as possible. Understandably many initiatives to improve VfM will address more than one of the four 'E's', however the bulk of this paper will look at measures specifically designed to improve the relationship between the intended and the actual benefits of projects (effectiveness), and how we can achieve equitable outcomes (equity). Further detail of this is provided below.

6 'Effectiveness' – Spending wisely

- 6.1 Business cases are the key component in decision making. Ensuring our business cases accurately and comprehensively capture the advantages and disadvantages of investment, including quantifying the anticipated benefits, is central to improving effectiveness. Improvements over the past year have been made in various areas, including:
 - (a) **Capability.** A business case learning hub has been set up to improve the clarity and navigation to all the resources available. Video recordings of training sessions are permanently available, so users can readily access either the entire course or individual sections to refresh their knowledge. More topic-focussed mini guides have been set up including Greenhouse Gases and Portfolio case making to ensure the latest guidance is being followed;
 - (b) **Legibility.** A business case dashboard has been released to summarise key information and metrics, this is being incorporated into new business case templates and will be included in all authority papers. This will strengthen the link between decision making and the business case, giving senior leaders visibility in a valuable summarised form. New low value/complexity business case templates have already been released and the high value/complexity equivalents are at an advanced stage of preparation; and
 - (c) **Maturing quantification.** Enhanced benchmarking, forecasting and valuation of key economic, environmental, and social impacts continues. This includes carbon emissions, new development dependent on

transport investment, and the health and well-being benefits of increased active travel. On the latter, a specific workstream has been established with the Department for Transport and other industry partners to develop the quantification of active travel impacts.

6.2 Pathway Stage Gates are the mechanism whereby projects/programmes are scrutinised at key decision points throughout the project lifecycle. Ensuring that the decisions taken at these Stage Gates are as robust as possible will enable us to have confidence in the right projects being progressed, with the right level of maturity in anticipated costs and benefits. Recent improvements to the process by which the Stage Gates operate have included:

- (a) Simplification. The previous Stage Gate certificate required up to 40 questions to be addressed at a review meeting, which was often time consuming and did not lead to a focussed discussion of the key issues. A new process has been developed to ensure as much work as possible is conducted in advance of the review meeting, so that a targeted discussion of the pertinent issues can occur, leading to more effective decision making;
- (b) VfM checklist. To continue to embed the VfM culture, and ensure it is considered during key decisions, we have introduced a mandatory VfM checklist at Stage Gates. The VfM assessment prompts you to consider a series of questions, focusing on best practice areas, such as lessons learned, Modern Methods of Construction and optioneering which if followed should help demonstrate a value for money approach. These assessments have been used at project, programme, and portfolio level, including being completed post construction (at Stage Gate six) to look back on what has been achieved; and
- (c) Gate quoracy. For robust decisions to be made at Stage Gates with input from all relevant areas of expertise and appropriate seniority, a consistent framework has been developed which outlines who should be quorate during a Stage Gate meeting, depending on the lifecycle stage and level of complexity. This enables a scalable approach to scrutiny from senior management and provides greater visibility of those most complex projects with challenging decision making.

Are we achieving the right outcomes?

6.3 The success of any project should be measured by whether the anticipated benefits have been realised and if any additional benefits have been realised. Historically, we have not systematically captured benefit data post-completion for all the investment programmes. Additionally, benefits can typically only be measured after several years of operation, once new capabilities and processes have fully bedded-in, so maintaining organisational focus for this long after completion can be difficult. Although some areas have achieved this, we recognise the need for a more robust process to consistently measure the impact of our investment choices. To this end, several activities are underway:

- (a) Introduction of a new Pathway Stage. Historically, projects are closed at Stage Gate 6 (project close), following full financial closure. However, there are several activities that remain to be completed focusing on benefits realisation, organisational lessons learnt and continuous improvement. Although there are some examples of these activities taking place it is often in an uncoordinated environment with little support and engagement from across the business. In response to this, a new Pathway Stage (Stage Seven) has been developed, which focuses on post-implementation and has been designed specifically to encourage activities to be undertaken whilst their value remains high. The new stage has been trialled on several projects and is ready to be implemented once organisational design changes have been embedded and responsibilities agreed;
 - (b) Portfolio benefit plans. Assessment of the collective impacts our investments are expected to have is advancing. Preparation of portfolio and programme-wide business cases is more frequently encouraged, and a key objective for the sponsorship function this year is to reinvigorate our portfolio benefits management strategies. This is aiding understanding of what different investments offer, individually, and in combination; and
 - (c) Specific benefit realisation activities. Over the past six months several significant projects have achieved key completion milestones. These include Crossrail, Northern Line Extension, and Bank Capacity Upgrade Project. Monitoring and evaluating their operation, and economic, environmental, and social effects is crucial to understanding whether they have delivered what we expected, and for learning lessons for future investment. Bespoke Benefit Management Strategies, and the monitoring and evaluation activities they detail are being acted upon. Updates on each, alongside other key projects and programmes will be brought to the Committee in due course.
- 6.4 While TfL strategic objectives are set out in the Mayor's Transport Strategy, it is often difficult to translate the strategic objectives through to individual project benefits, and particularly to prioritise between different investment choices to ensure we are delivering the most effective mix of projects to progress our targets and commitments. This missing link between strategic objectives, tactical priorities, and the contribution of different investment approaches to each is now supported by a 'Strategic Outcome Framework' (SOF).
- 6.5 The SOF is a method of scoring the order of magnitude contribution that different projects are expected to make against a range of 15 strategic objectives. Scores are assigned based on a high-level quantification of impact as much as possible. It also captures other information used to inform prioritisation, such as deliverability, contractual commitments, affordability, and value for money.

6.6 This framework was used for the first time to help inform the 22/23 budget setting process for enhancement projects and will be refined further ahead of business planning in summer 2022. Among the useful things that the SOF offers are an at-a-glance view of the benefits and disbenefits of different initiatives against a consistent set of outcomes using a common scale and a view on the value contribution of different types of investment make to different outcomes.

7 'Equity' – Spending fairly

7.1 One of the key differences between the NAO VfM framework and TfL's is that 'equity' has been given greater prominence and defined as the 4th pillar. This reflects the role that TfL can play in addressing disparity across London, and the focus we want to have on specific equity workstreams.

7.2 **Measurement.** While it is clear that programmes like Step-Free Access have clear and distinct accessibility benefits, it is less clear how the totality of our investment programmes is addressing some of the more macro-level inequalities across London. By developing more holistic measurement tools that better capture improvements to transport for diverse communities, we hope to be able to better inform future prioritisation exercises. In tandem, we are using data on diversity and inclusion to inform investment priorities, ensuring schemes are targeted at locations where they will have the greatest benefits on tackling inequalities. We are taking steps to identify data gaps and disaggregate data where possible to enable better analysis and more equitable decision-making.

7.3 **Inclusive design:** We have developed a new Inclusive Design Programme to make it more explicit how we will embed the process of inclusive design within the organisation so that we create a network which serves everyone. We aim to adopt and integrate an inclusive design approach to transport, which will help to create better environments for the greatest number of people.

7.4 Our principles for creating an inclusive design are that design:

- (a) places people at the centre of our thinking to create environments that make everyone feel welcome, safe and comfortable;
- (b) produces environments everyone can use without separation, segregation or the need to navigate alternative routes; and
- (c) provides real choice and flexibility where a single solution is not possible.

7.5 When we get inclusive design right, we will have a transport network and workplaces that offer safe, dignified, and intuitive use by everyone. It will have places where everyone feels welcome, regardless of ability or personal circumstance. By designing places that feel welcoming and secure, we will also support the Mayor's commitment to social integration; offering opportunities for people to share spaces in a way that encourages interaction and reduces both levels and fear of crime. Inclusive design can deliver beautiful environments that are inspiring and enjoyable to use.

- 7.6 Improving the process, governance, consistency, and capability around Equality Impact Assessment (EQIA) process is a key element of our inclusive design approach. An internal review of the EQIA process has been commissioned and will start in September 2022. A programme of improvement will be developed and taken forward following the outcome of the audit. We have appointed a new Senior Assurance Manager to oversee, manage and improve the organisation wide EQIA process, including creating new guidance, training, governance, and processes.
- 7.7 **Inclusive policies, practices, and standards:** Wherever practicable we will use the learning from our monitoring and evaluation, as well as stakeholder engagement to ensure that we have inclusive policies, standards and guidance that help us to deliver inclusive outcomes more consistently.
- 7.8 Engagement enables public authorities, and people with an interest in their work, to pool their knowledge and experience of eliminating discrimination, advancing equality of opportunity, and fostering good relations.
- 7.9 Good equality information is the foundation of evidence-based decisions, and it will enable us to design and deliver effective and efficient policies. Engaging with stakeholders and employees will help us to base our policies on evidence, rather than on assumptions. Where we have gaps in our information base, engagement can help us to fill them. This may be particularly helpful for areas which are most sensitive where we are less likely to have quantitative information. As well as informing decisions, and identifying solutions, engaging stakeholders throughout the project lifecycle can help us to prioritise finite funding and resource. It can also help us monitor and understand how effective our work is, whether there are unexpected consequences from it, and how to make it more effective in the future.
- 7.10 This is particularly relevant for our stakeholder engagement work during project design phase and at public consultation points, ensuring we are engaging with the broadest possible cross-section of society. For example, on top of all the existing channels we use during public consultations, we have recently gone further to include British Sign Language videos to explain our consultations and are partnering with disability allies to promote consultations through their existing networks. We also now convert all key consultation materials into 'easy read' documents and provide an 'easy read' questionnaire as standard on our consultations. Previously we did this only on large pan-London consultations. This not only benefits the wider community, but this is especially beneficial to engaging adults with learning difficulties in the consultation process.

8 Looking Ahead: Next Steps

- 8.1 Over the summer of 2022, we will be implementing a new investment governance regime, as well as beginning to make organisational changes that better reflect the new Executive-level structure. This will provide the opportunity to continue to focus on ensuring VfM is a key component in decision making.

8.2 In recognition that VfM initiatives impact many areas of the business and coordinating a coherent programme of activity can be challenging, we have identified dedicated resource to develop and monitor the programme. This resource will be based in Investment Delivery Planning, within the benefits and outcome planning function. This will also directly address one of the four recommendations made by IIPAG in August 2021 ('Investment Delivery Planning should consider further strengthening its central pool of VfM expertise').

List of appendices to this report:

None.

List of background papers:

Financial Sustainability Plan, January 2021

Approach to VfM submitted to Audit and Assurance Committee, December 2020

IIPAG report 'Review of Progress on Value for Money' August 2021

Review of Progress on Value for Money submitted to the Programmes and Investment Committee, October 2021

Capital Efficiency Plan Update submitted to Programmes and Investment Committee, May 2022

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Programmes and Investment Committee

Date: 20 July 2022

Item: London Underground Four Lines Modernisation Programme

This paper will be considered in public

1 Summary

- 1.1 The purpose of this paper is to update the Committee with progress on the delivery of the London Underground (LU) Four Lines Modernisation (4LM) Programme.
- 1.2 A paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from the meeting.
- 1.3 Financial Authority is currently provided through the two-year Budget for 2022/23 and 2023/24, approved by the Board in March 2022. The current funding agreement with Government expires on 13 July 2022.

2 Recommendations

- 2.1 **The Committee is asked to note the paper and the exempt supplemental information on Part 2 of the agenda and:**
 - (a) **approve additional unbudgeted Programme and Project Authority for the sum set out in the paper on Part 2 of the agenda; and**
 - (b) **note that the matters for which Authority is sought above extend beyond the period of the 2022/23 Budget and provision will, therefore, need to be made for them in future Budgets.**

3 Background

- 3.1 The LU Sub-surface Railway (SSR) consists of four lines – the Metropolitan, District, Hammersmith & City and Circle lines. Pre-pandemic, the four lines carried 1.3 million passengers per day, which represented a quarter of overall LU ridership.
- 3.2 The 4LM Programme is in the process of replacing, modernising and integrating life-expired assets (Signalling, Rolling Stock, Track, Power and Depots) on the SSR. This will add capacity (through improved train frequency when demand sufficiently recovers) and improve journey time. The 4LM Programme is the largest single upgrade in the history of the network. Due to its scale and interoperation with other LU lines, Train Operating Companies and Network Rail, it has a high level of complexity. Although we already have Automatic Train

Control on the Victoria, Jubilee, Northern and Central lines on the LU network, the scale and complexity of upgrading the four lines of the SSR in one programme is a global first and will transform the overall experience for our customers.

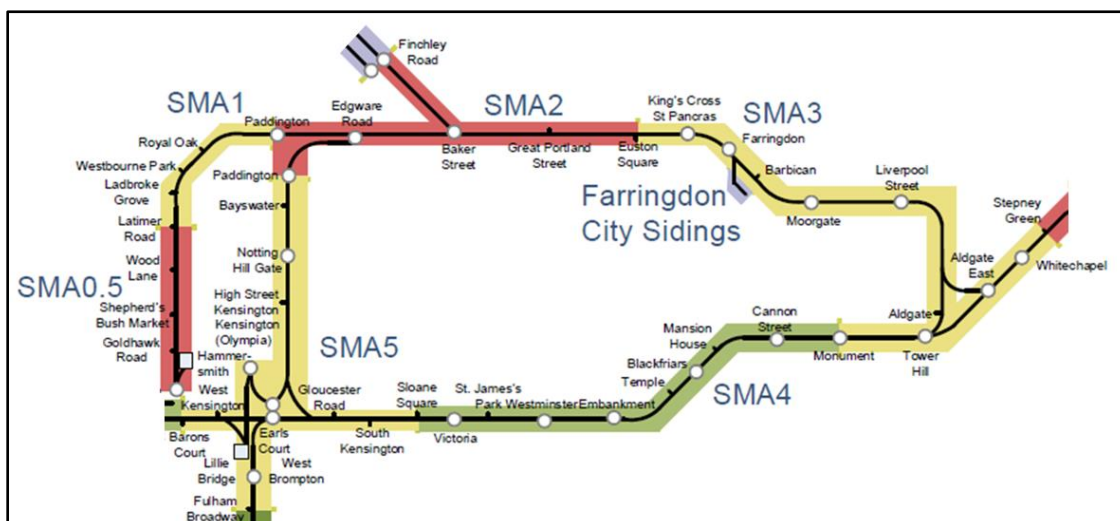
- 3.3 The renewal of life- expired assets is essential to ensure we have a reliable asset base which can be maintained at an affordable cost. Future demand and operational costs will determine the higher frequency timetable introduction dates once the capability the new signalling delivers is commissioned.
- 3.4 In July 2015 the Board approved Programme and Project Authority of £5.4bn to undertake the Programme. A subsequent request to increase Programme and Project Authority was approved by the Committee in July 2021. The Programme consists of 192 new trains, infrastructure changes, upgrades to three depots which will maintain the trains and new signalling (and associated signalling works). With the full introduction of the new fully walk through, air-conditioned trains in 2016, most of the work is now complete except for the signalling works.
- 3.5 A contract was awarded in July 2015 to Thales Rail Signalling Solutions to signal the SSR with an automatic, modern signalling system. Given the scale of the programme, the SSR has been split into sections (known as Signal Migration Areas or SMAs) for the purpose of introducing the new signalling system. Work is well advanced in the design and installation of the new signalling system and the delivery of the supporting infrastructure.
- 3.6 As reported to the Committee in July 2021 while the infrastructure works have made good progress a combination of factors (linked to software development, installation and subsequent impact of the coronavirus pandemic) has delayed the signalling. An extensive review of cost and time has been undertaken which has informed the requested change in Programme and Project Authority. A further update will be provided to the Committee when high risk development of software on the interoperable sections of the Metropolitan line has been progressed.

4 Project Update and Challenges

Signalling Go-Live

- 4.1 The section of signalling, between Sloane Square, Paddington, Fulham Broadway and Barons Court (SMA5) went live on 27 March 2022. Completion of SMA5 represented a major achievement for the programme as it involved upgrading the highly complex junction at Earl's Court and completing the implementation of Communication Based Train Control (CBTC) across the central area of the sub surface lines including the entire Circle line.
- 4.2 The area now operating under the new signalling contains 42 stations and four complex junctions. By means of comparison, the Jubilee Line has 27 stations.

Figure 1: map showing sections of the SSR now operating with ATC



Programme

- 4.3 As previously reported to the Committee in July 2021, the 4LM Programme has been under pressure and, in common with other TfL projects, it was delayed further in 2020 due to the impacts of the coronavirus pandemic. This included a safe stop from March to June 2020. The project restarted in phases from June 2020.
- 4.4 Software development continues for future signalling migration areas covering the eastern end of the District line (SMA6 and 7) and the Metropolitan line between Finchley Road and Preston Road (SMA8), including the interface with Neasden Depot and the Jubilee line.
- 4.5 Since commissioning SMA5 in March 2022, the underlying system performance has been good, but a specific software issue required fixing. To introduce further improvements to the existing sections in service, an additional software update will be implemented in November 2022 prior to the next SMA going live. Our schedule for future signal migration areas going live has therefore been reviewed and we now expect SMA6 and SMA7 (both covering the eastern end of the District line) to go live in the first quarter of 2023. The final section of signalling, SMA14 (Rayners Lane to Uxbridge), is expected to go live between spring and autumn 2025.
- 4.6 Since our last update to the Board in July 2021 the Programme has successfully delivered journey time improvements of up to ten per cent on the north side of the Circle line through a timetable change in September 2021 (this improvement was originally planned for May 2021, when the project was authorised in 2015). As an example, this means a journey between Paddington and Moorgate is reduced by two minutes. Aside from the introduction of the new trains, this is the first key benefit to be delivered for our customers, utilising the capability of the new signalling system.
- 4.7 The successful commissioning of the SMA5 area in March 2022 allows a new timetable to be introduced in September 2022 which will make improvements to customer journey times in a wider area. At this time the entire Circle line will benefit from the improved journey times the new signalling enables. This will enable a journey time timetable improvement (average 5 per cent quicker) to be

implemented on the Circle and District lines between Monument, Fulham Broadway, Barons Court and Paddington. As an example, this means a journey between Barons Court and Monument will be reduced by over a minute.

- 4.8 This timetable was not part of our plans in 2015. However, due to the reduction in ridership and the need to carefully manage the operating costs associated with timetable enhancements a decision was made to improve journey times without any uplift to the trains per hour.
- 4.9 Subject to the same evaluation of the balance between demand and operating costs the implementation date of the 30 trains per hour (tph) timetable and subsequent frequency uplifts remains under review.

Table 1: Movement of planned dates set at Programme and Project Authority in 2015

Timetable Milestones	2015 Planned Date	Current Forecast Date	Current Forecast Capability Available Date
Runtime Improvements (SMA3)	May 2021	Achieved Sept 2021	Mar 21
Runtime Improvements (SMA5)	N/A	Planned Sept 2022	Mar 22
30 trains per hour in Central Area	Dec 2021	TBC, subject to ongoing reviews of demand	Spring 2023
32 trains per hour in Central Area	May 2022	TBC, subject to ongoing reviews of demand	Summer 2025*
24 trains per hour Metropolitan Line	Dec 2021	TBC, subject to ongoing reviews of demand	Autumn 2023
26 trains per hour Metropolitan Line	Dec 2022	TBC, subject to ongoing reviews of demand	Spring to Autumn 2024
28 trains per hour Metropolitan Line	May 2023	TBC, subject to ongoing reviews of demand	Spring to Autumn 2025

* Achievement of a reliable 32tph service level is also dependent on the renewal and remodelling of Aldgate Junction which is planned for summer 2025

- 4.10 As a result of the delays to the signalling software roll out as previously reported to the Committee in July 2021 the timetable frequency improvements cannot be introduced by the dates planned in 2015. However, due to the reduction in ridership and the need to carefully manage operating costs we will need to carefully consider the timing of frequency uplifts and they may not in any case immediately follow the delivery of the signalling capability.
- 4.11 We will continue to review the implementation dates for service frequency improvements based upon balancing demand with operational costs, Network Rail timetable introduction dates, operational readiness and the dates at which capability becomes available.

Infrastructure Works

- 4.12 We have completed all the planned 29 track layout changes. These changes allow trains to run faster and deliver maintenance cost savings by installing modern track.
- 4.13 We have also completed the installation of all required 38 signal equipment rooms ready for Thales to install the signalling equipment.
- 4.14 All trackside signalling assets have now been installed on the District, Circle and Hammersmith & City lines and on the Metropolitan line as far as Preston Road.
- 4.15 Design and installation of the trackside signalling assets continues on the Uxbridge and Amersham branches of the Metropolitan line beyond Preston Road; known as Signalling Migration Areas (SMA) 9, 13 and 14. In SMA9, 74/91 assets are installed; in SMA13, 75/185 assets are installed; and in SMA14, the design is being completed to allow the installation to commence from summer 2022. March 2023 is targeted for all the installation to be completed.
- 4.16 The installation of the new cable route management system is due for completion by July 2022 with only minor snags currently outstanding. The signalling cable installation is in progress with 502km remaining from a total of circa 6000km, meaning this work is over 90 per cent complete. Completion is expected by the end of 2022.
- 4.17 Upgrade works at Ealing Common Depot bringing new facilities to allow maintenance of the new train stock are now complete (the final shed being brought into use in February 2022). Along with the already completed upgrade of Upminster Depot we have now delivered casualty and planned maintenance facilities for the District, Hammersmith & City and Circle line trains.
- 4.18 The Heavy Maintenance Facility works at Neasden Depot have made good progress in the Long Shed with works predominantly complete including track, installation of cable routes, new power supplies, new lighting and the installation of raised maintenance platforms. The procurement is in progress for the planned upgrades to the Heavy Lifting Shed and the new Staff Accommodation Block. When complete in 2024 this facility will enable planned overhaul of the Metropolitan line trains.

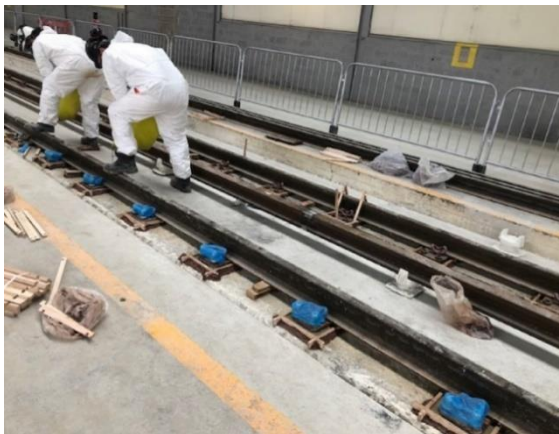


Figure 2 – Track works at Neasden Depot



Figure 3 – Cable Route installation

Train Fitment

- 4.19 We continue to progress with the fitment of signalling equipment to our fleet of Engineering Vehicles. All the 29 Battery Locomotives have been completed enabling the fleet to run across the entire SSR. Both D-Stock Rail Adhesion Trains have been fitted and await testing. We are on track to begin modification of the first Tamper Train in June 2022.

Closures

- 4.20 Closures are required to enable the delivery of the new signalling system. Crucially, they are also used to familiarise Train Operators with the new system. TfL carefully monitors the use of weekend closures to ensure that each closure is used as efficiently as possible for installation and testing of the new signalling system and infrastructure. Weekend closures are also subject to change to avoid unnecessary closures when plans change.

District Line Branches

- 4.21 As reported to the Committee in July 2021 following a review assessing and challenging costs and schedules for the Programme, the western branches of the District line will not be re-signalled. This means sections of the District line south of East Putney and west of Stamford Brook will remain under the existing signalling. Journey times in these sections will remain unchanged, however, we can still increase frequencies to up to 16 trains per hour, as originally planned.

Metropolitan line Branches

- 4.22 When the decision was made in 2021 not to continue with the re-signalling of the District line branches, we also examined the case to continue with the re-signalling of the Metropolitan Line north of Finchley Road. The re-signalling of the Metropolitan line differs from the District line because:
- (a) the existing signalling on the Metropolitan line is older than the District line. If it is not replaced the ongoing renewal and maintenance costs are significant and greater than the District line;
 - (b) our planned step-change in passenger experience relies on the line being re-signalled. If we retain the legacy signalling, then we will be unable to either reduce passenger journey times or increase train frequencies; and
 - (c) as we are close to completing the installation works our opportunity to save costs by reducing scope are limited and outweighed by the ongoing renewal and maintenance costs of retaining the existing signalling.
- 4.23 Replacing life-expired signalling is key to achieving cost effective management of our asset base. Though we may be able to achieve some immediate savings by not signalling the Metropolitan line branches, in the longer term we will spend more than we save and do not achieve any customer benefits. Despite the challenges the Programme has faced, investing in the capability of the new signalling continues to represent good value for money.

5 Benefits and Value

- 5.1 The introduction of the 192 new trains has delivered 25 per cent of the programme benefits which include:

- (a) the first step up in capacity while maintaining the current train service frequency as the new trains are longer and carry more passengers;
 - (b) an improved customer experience with walk through gangways, in-car CCTV, air conditioning, a Rail Vehicle Accessibility Regulations compliant saloon and improved Customer Information Systems; and
 - (c) the opportunity to recover energy through regenerative braking.
- 5.2 The introduction of the new signalling will deliver 75 per cent of the programme benefits, which include:
- (a) speed increases which reduce journey times between stations; and
 - (b) the ability to run trains closer together increasing service frequency up to 32tph.

6 Assurance

- 6.1 TfL Project Assurance and Independent Investment Programme Advisory Group (IIPAG) have undertaken their review of the 4LM Programme via continuous assurance. They have received detailed briefings from the project team and are fully aware of the issues and challenges on 4LM. In addition, TfL Project Assurance have undertaken a targeted review to support this submission to the Committee.

List of appendices to this report:

Appendix 1: Signal Migration Area map

Exempt supplementary information is included in a paper on Part 2 of the agenda.

List of background papers:

Independent Investment Programme Advisory Group Quarterly Report

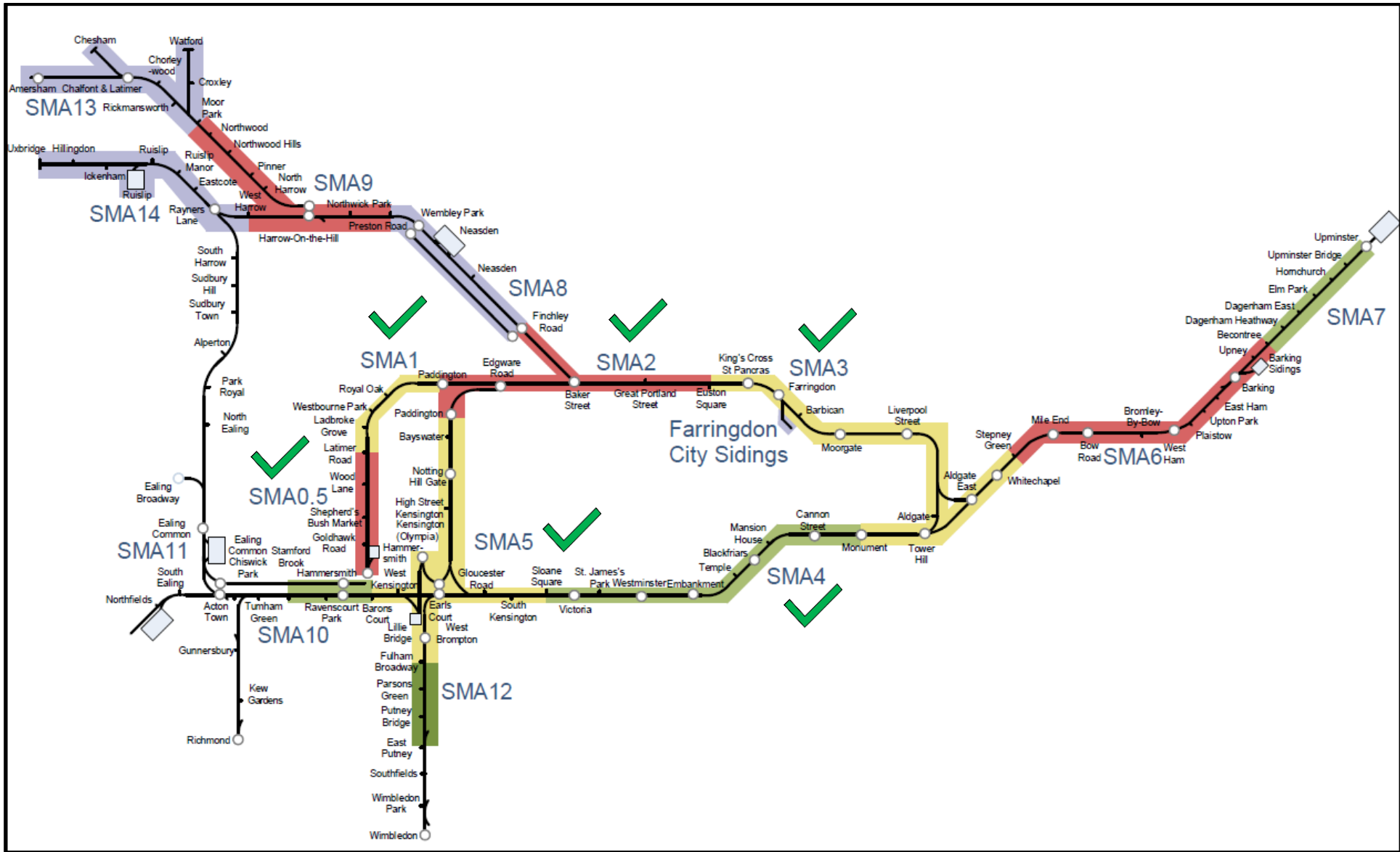
TfL Project Assurance Report

Management response to IIPAG and TfL Project Assurance Reports

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Appendix 1: 4LM Signal Migration Area map



Programmes and Investment Committee



Date: 20 July 2022

Title: Northern Line Extension

This paper will be considered in public

1 Summary

- 1.1 Following a successful launch of the Northern Line Extension (NLE) on 20 September 2021 this submission provides an update on the final stages of delivery and closeout of the programme, as well as highlighting some of the early benefits realised to date.
- 1.2 This submission provides an update to the last update to the Committee on 16 October 2020.
- 1.3 Supplementary information is included in Part 2 of the agenda. This information is exempt and is therefore not for publication to the public or press by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

2 Recommendations

- 2.1 **The Committee is asked to note the paper and the supplementary exempt information on Part 2 of the agenda.**

3 Background

- 3.1 The NLE delivered a 3.2km twin tunnelled extension of the Northern line Charing Cross branch from Kennington to Battersea Power Station via Nine Elms. The NLE supports wider regeneration of the Vauxhall Nine Elms Battersea Opportunity Area, which is aiming to deliver 20,000 new homes and 25,000 new jobs, through significantly improving transport accessibility in the area. The NLE also delivered two new step-free Zone 1 stations therefore improving public transport accessibility for people with mobility impairments.
- 3.2 Following a successful public launch event attended by the Mayor and the Secretary of State for Transport the NLE entered revenue service on 20 September 2021, achieving the planned opening date despite a ten-week suspension of construction in 2020 due to the coronavirus pandemic.
- 3.3 The NLE was the first major extension of the London Underground since the Jubilee line was extended in the late 1990s. This culminated a six-year construction period in which the stations, ventilation shafts, tunnels, track and signalling systems were delivered and fitted out by the joint venture of Ferrovial

Agroman and Laing O'Rourke (FLO) and Thales (respectively). Photos of the stations and infrastructure delivered can be seen in Figure 1.

3.4 During the final stages of delivery in 2021 several concurrent workstreams were successfully completed to reach revenue service, these included:

- (a) infrastructure and systems commissioning and testing;
- (b) signalling testing and commissioning;
- (c) station and train-based training and familiarisation, trial operations and shadow running; and
- (d) obtaining necessary consents and assurance.



Figure 1: Infrastructure constructed as part of the NLE

4 Current Progress

4.1 Since entering revenue service, the Delivery Team, FLO and Thales have worked to deliver outstanding scope and conducted a thorough snagging process, including addressing almost 20,000 observations and minor work items. A detailed technical assurance of documentation has also been carried out with documents having been submitted, assured, and accepted.

- 4.2 Contract completion with FLO was achieved in June 2022 with the contract delivered within authority and under the latest budget provision. A structured handover process has been undertaken using the Design and Build contract with FLO and Thales with all assets now handed over to LU Asset Operations for full planned preventive and reactive maintenance.
- 4.3 A defects period runs until July 2023 to allow any new and existing defects to be addressed within a 12-month defect period as per standard practice on major infrastructure projects. Testing and implementation of solutions is ongoing and all defects will be addressed and assured by TfL engineers within the 12-month defects period.
- 4.4 The NLE opened with a service frequency of six trains per hour in the peak periods and five trains per hour off peak. The service frequency was increased on 27 June 2022 with the implementation of Working Timetable 59 meaning the extension is now served by 12 trains per hour in the peak periods and ten trains per hour off peak. Therefore, trains now serve the NLE stations every five to six minutes, depending on time of day.

5 Benefits Realisation

- 5.1 The NLE has delivered a step-change in public transport accessibility in an area which was previously poorly served by public transport despite its relatively central location.
- 5.2 The extension is already playing an important role in London's recovery from the pandemic with over three million trips recorded before June 2022. Battersea Power Station is the busier of the two new stations with approximately 60,000 trips per week since the NLE opened and almost 13,000 trips recorded recently on the busiest day of the week (Wednesday). Nine Elms station attracts over 30,000 trips per week and almost 7,000 trips on the busiest day. Based on this level of demand we anticipate up to five million trips in the first year of the NLE. It is important to note that these are still early results and weekly data is influenced by specific events such as local leisure events, engineering closures and strikes as can be seen in weekly trip data shown in Figure 2.

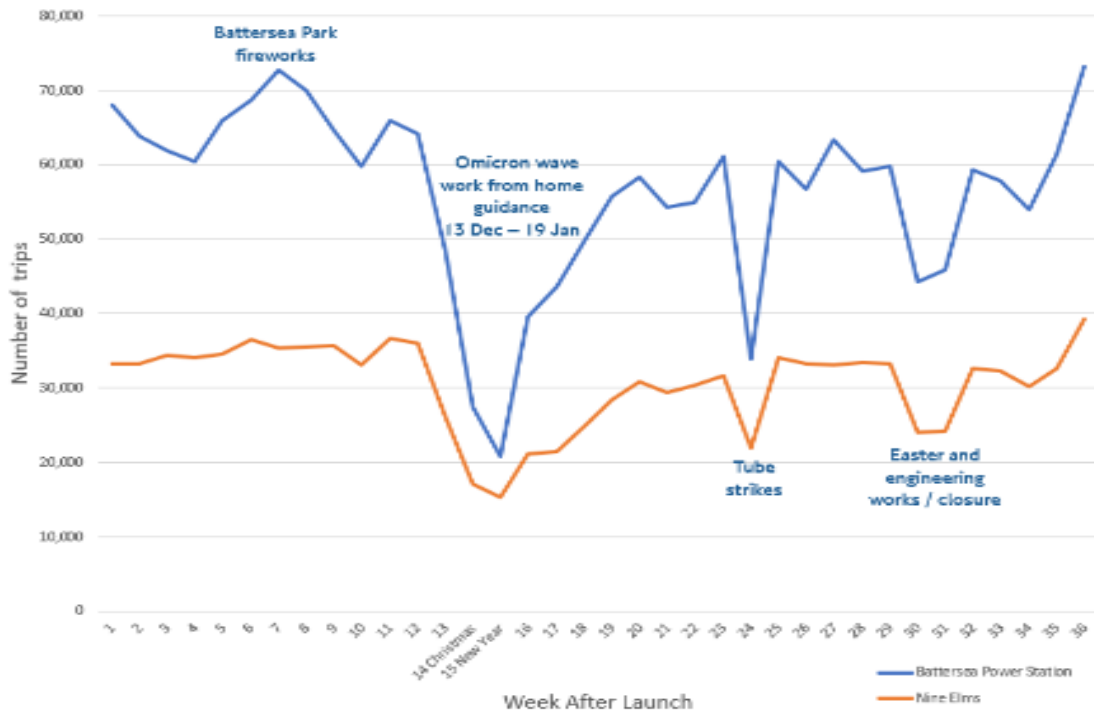


Figure 2: Weekly Northern line extension trips to date (combined entries and exits)

- 5.3 It is anticipated passenger usage will continue to grow in future months and years due to a combination of factors including London’s continued recovery from the pandemic and the associated return to offices; planned growth and regeneration in the Opportunity Area as more homes and offices are completed; and the increase in service frequency making the extension more popular with reduced waiting times.
- 5.4 Based on recently updated modelling we are predicting long-term increases in NLE trips as shown in Figure 3. This graph shows a projection of future NLE trips using a combination of existing performance data and annual uplift factors with over ten million trips predicted in 2024/25. This projection is compared to updated NLE modelling forecasts which account for low and high growth scenarios following the coronavirus pandemic. Construction workforce trips are not included in long-term modelling so have been removed from the NLE projection.
- 5.5 Key destinations for trips to and from the NLE include stations in the City and West End including Bank, London Bridge, Leicester Square and Waterloo. Analysis of key journey time pairs before and after opening NLE found the extension has led to a 17-minute reduction in passenger journey times on average, representing a reduction of almost 50 per cent.

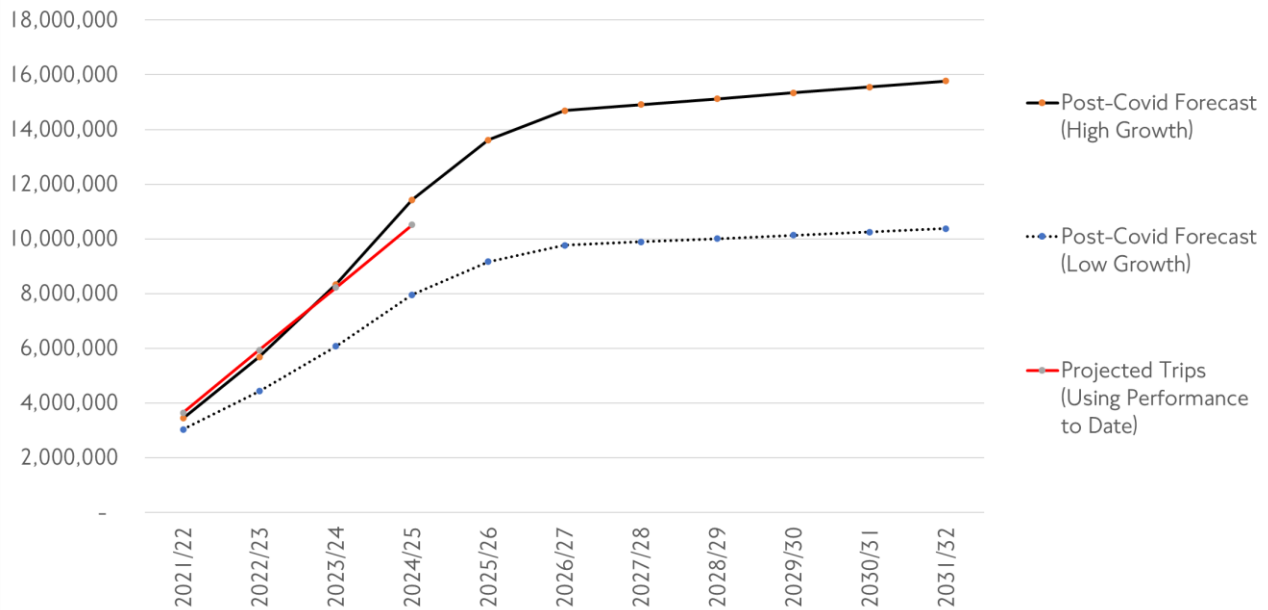


Figure 3: Projected annual Northern line extension trips (excluding construction)

- 5.6 The NLE is key to regeneration of the local area and plans to deliver much needed new homes and jobs. Construction of the NLE has been a significant factor in providing the necessary infrastructure to enable the scale of residential development and establish a new vibrant commercial and residential quarter on London’s South Bank. As of March 2021, planning consent had been granted for over 18,550 homes with 8,100 already completed.
- 5.7 During its construction, the NLE programme itself supported around 1,000 jobs, including 79 apprenticeships and 159 previously unemployed people. In terms of employment in the Opportunity Area, the target of 25,000 new jobs remains on track to be delivered. High profile organisations such as the US Embassy and Penguin Random House have already moved into the area and Apple are due to move into their new campus in Battersea Power Station which can accommodate up to 3,000 staff.
- 5.8 Delivery of the NLE has also contributed to economic activity beyond London with over 50 contracts worth approximately £305m awarded to UK suppliers outside of London. For example, the roundels were made on the Isle of Wight, high-integrity door sets were made in Manchester and metalwork and glazed balustrades were made in Kent. This broad supply chain helps spread economic growth and contributes towards Levelling Up with more than a third of total contract spend being outside of London as illustrated in Figure 4.
- 5.9 It is still early in the lifecycle of an infrastructure scheme such as the NLE and it is anticipated that the full benefits will be realised over the coming decades. We plan to continue to monitor benefits of the NLE and would like to undertake further analysis to better understand other areas such as the revenue impacts, the long-term impact on regeneration and wider economic benefits, showcasing what investment in infrastructure like the NLE can bring, particularly with future

aspirations to deliver other major schemes including the Bakerloo Line Extension and Crossrail 2.

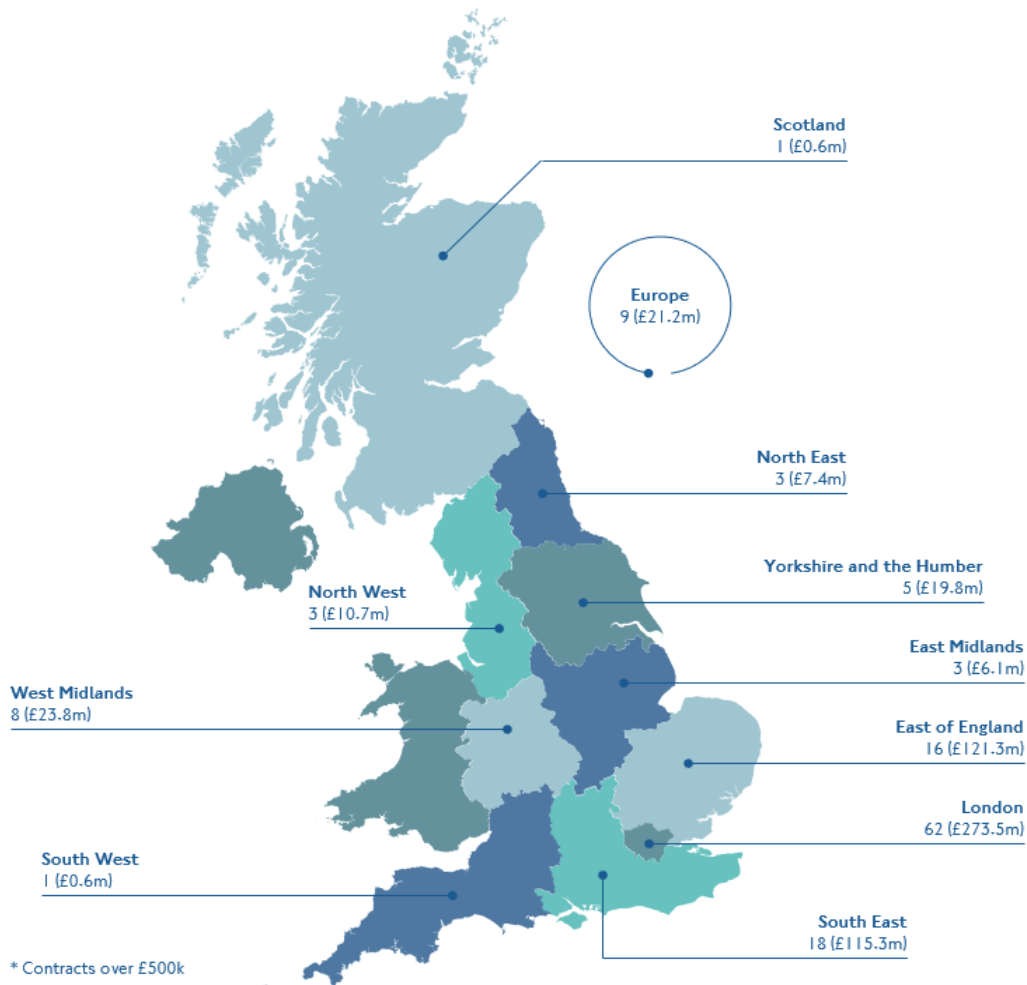


Figure 4: Regional economic benefits from NLE supply chain (spend and number of businesses by region, contracts over £500k)

6 Governance

- 6.1 To ensure successful completion and closeout of the delivery stage of the NLE first-line assurance has been undertaken by the Sponsor, the Programme Management Office and the Delivery Team through implementing a structured programme and project stage gate procedure.
- 6.2 In total 20 project level stage gate meetings have been held since the NLE opened in September 2021. Individual gate meetings have focussed on specific elements of the NLE including Battersea Power Station, Nine Elms Station, tunnels and track, ventilation, power, line-wide communications, and IM systems. These gate reviews have ensured outstanding scope, snags and assurance have been completed since the NLE entered revenue service, when several interim arrangements had been in place to enable the extension to open.

- 6.3 The delivery stage of the NLE is due to conclude with a Programme Gate C (Delivery of Tranches) currently scheduled for 21 July 2022. Final closure of the NLE programme (including closure of all defects and financial close) is due at a Programme Gate D (Close) which will take place in 2023.
- 6.4 A series of lessons learnt workshops were held as part of the programme and project stage gates. Key lessons identified included:
- (a) the project team and supply chain treated the NLE as a railway system from the outset by ensuring the civils and systems integration phases were equally well planned, including provisions for installation, testing and trial operations;
 - (b) understanding the complex design relationship with oversight development and ensuring design and delivery decisions are taken at the appropriate time;
 - (c) understanding construction phasing and changes in constrained sites with multiple third parties;
 - (d) a one team collaborative approach and strong relationship with the contractor meant the programme was able to adapt to covid practices quickly and safely;
 - (e) understanding relationships between projects and programmes and the related impacts on benefits and delivery (e.g. Jubilee and Northern line Additional Trains programme and Bank Blockade); and
 - (f) a well planned and coordinated stakeholder launch helped maximise the NLE's early impact and generated support.

7 Assurance

- 7.1 First-line assurance continues to be carried out on the Programme and its constituent projects. Second-line assurance is being undertaken on a continuous basis and no further formal reviews are planned.

8 Financial Implications

- 8.1 The NLE has an estimated final cost of £1.1bn. Therefore, the Programme was delivered within existing authority despite the cost pressures brought about by the pandemic.

List of appendices to this report:

Exempt supplementary information is included in a paper on Part 2 of the agenda.

List of Background Papers:

None

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Programmes and Investment Committee



Date: 20 July 2022

Item: London Underground Infrastructure Renewals Programme

This paper will be considered in public

1 Summary

	Existing Financial Authority (to 2024/25)	Existing Programme and Project Authority 2022/23 and future years	Additional Authority Requested 2022/23 & 2023/24	Total Authority	Prior Years	Forecast 2022/23 to 2027/28	Total Forecast
LU Infrastructure Renewals	£1,279.4m	£1,192.2m	£0.0m	£1,192.2m	£631.1m	£627.8m	£1,258.9m

Table 1: Summary of Programme and Project Authority

- 1.1 This paper updates the Committee on the progress of the London Underground Infrastructure Renewals Programme (the Programme). Table 1 shows that no additional Programme and Project Authority is requested at this time. The Programme includes the following sub-programmes: Built Environment and Civils, Systems (Power, Electrical, Fire, Mechanical and Communications, Lifts and Escalators), and Safe Track Access. The Programme maintains the safety, operability, and reliability of London Underground (LU) assets through a prioritised programme of renewals.
- 1.2 This submission builds upon previous updates to the Committee in March 2021 for the LU Renewals Programme, and December 2021 for Lifts and Escalators, and brings these into a single Financial Authority of £1,279.4m. The balance of this is carried forward as set out in table 6 below.
- 1.3 The focus of this paper is to:
 - (a) present the Programme’s achievements since the previous submissions;
 - (b) provide assurance to the Committee on the progress of the Programme; and its future plans; and
 - (c) set out the existing Programme and Project Authority alignment to the current forecasts for 2022/23 and 2023/24.
- 1.4 Financial Authority is currently provided through the two-year Budget for 2022/2023 and 2023/2024, approved by the Board on 23 March 2022. The current funding agreement with Government expires on 13 July 2022.

- 1.5 If additional funding is not available, a prioritisation of the TfL Investment Programme will be required, and some programmes and projects will not be taken forward and revised authority will be sought as appropriate. All approvals given will be overseen in accordance with TfL Business controls in respect of draw down

2 Recommendations

2.1 The Committee is asked to note the paper and:

- (a) agree that the London Underground Renewals and Lifts & Escalators Programmes be consolidated into a London Underground Infrastructure Renewals Programme with a total Programme and Project Authority of £1,192.2m; and**
- (b) agree that the London Underground Fleet, Track and Signals Programmes be consolidated into a London Underground Train Systems Programme with a total Programme and Project Authority of £1,790.3m.**

3 Background

Strategic Context

- 3.1 The Mayor's Transport Strategy (MTS) has three key themes: healthy streets and healthy people; a good public transport experience; and new homes and jobs. Maintaining a state of good repair of LU assets is key to delivering all these plans. All LU Renewals are directly related to a good public transport experience by maintaining the asset in a state of good repair. Increased public transport use supports Healthy Streets and delivers growth in locations with high public transport capacity.
- 3.2 At present each of the asset groups is managed as separate programmes with individual authorities. In order to deliver more efficiently reduce the duplication of reporting and allow the business to consider how asset work together as a system we are combining the asset groups into larger programme authorities. These are Infrastructure Renewals (Built Environment and Civils, Building Systems, Power and Electrical, Lifts and Escalators), and Enhancements (Accessibility, Station Development).
- 3.3 Following approval in March 2021 of the LU Infrastructure Renewals Programme and Project Authority, in May 2021 a revised budget was adopted. Expenditure of £68.5m on renewals was constrained below the planned amount in 2021/22 and was significantly lower than the £168m 'Do Minimum' scenario under the Long Term Capital Plan (LTCP) to maintain a stable asset condition.
- 3.4 We are now working under the "Managed Decline" scenario where Renewals across the whole of TfL are budgeted to a total spend of £600m in 2022/23 and an estimated £700m from 2023/24 onwards.

Asset duties and responsibilities

- 3.5 The regulations that govern our operations with regards to assets include:
- (a) the Railways and other Guided Transport Systems (Safety) Regulations 2006, require TfL to apply to the Office of Rail and Road (ORR) for certification and authorisation to operate trains, stations, and infrastructure safely. Authority was approved by ORR in January 2022 for a further 5 years;
 - (b) the 2010 Rail Vehicle Accessibility (non-Interoperable rail systems) Regulations 2010 under the Equality Act 2010; and
 - (c) regulations under the Health and Safety at Work etc. Act 1974 including working at height, electricity, noise, manual handling, personal protective equipment, control of hazardous substances, and Construction Design Management.

Asset Strategy – Maintaining assets in a State of Good Repair

- 3.6 The State of Good Repair (SoGR) describes the condition in which TfL seeks to maintain assets to provide a safe and reliable network that minimises whole life costs and, where appropriate, meets customer expectations. The SoGR is based on industry standard condition measures which differ by asset type, for example the standard that describes the specific condition of track is different to the condition for a lift. TfL records the asset condition using a combination of a five-point physical condition (Very Good, Good, Fair, Poor, Expired) and where the SoGR is below the preferred range it reflects the need for renewals investment to deliver a safe and reliable network and reduce the risk of injuries, restrictions, and closures arising from critical failure.
- 3.7 Data for LU assets is being collated to monitor both trends and forecast future performance. Asset Strategies are in place and are being enhanced.
- 3.8 Details of how SoGR is measured and calculated are provided in Appendix 1. The level of maturity of asset data varies between asset groups. Currently there is no overall SoGR measure that can be reported. Work is ongoing to address this. Some data is available with Lifts and Escalators being the most mature.

Impact on Operations

- 3.9 Due to the managed decline funding position, the SoGR for all assets across TfL is expected to deteriorate further in 2022/23 although the data in some assets is less mature and will require engineering assessment based on asset knowledge as condition changes. The consequence is that there will be increased likelihood of assets being restricted or taken out of service to maintain safety. There will be an increased need for interim measures specific to the asset group and condition, such as making stations 'exit only' if lift or escalator failures severely impact pedestrian circulation, or service restrictions should communication systems fail.
- 3.10 Available funding is targeted towards the most critical assets held in the Asset Condition Register (ACR), prioritised as Code 1 (legal compliance) and Code 2 (safety issues). The ACR is reviewed annually. Renewals are prioritised to ensure

we maintain safety and reliability as much as possible reducing the need for additional inspections and maintenance work. There is insufficient funding to address all Code 1 and Code 2 issues as proactive renewals and an increased level of inspection, reactive maintenance and service restrictions are required to maintain safe operations. This leads to increased costs and reduced service availability and reliability.

- 3.11 As the proposed programme of renewals is below the Do Minimum investment required in our Asset Strategy and the LTCP, the burden on maintenance and operational budgets will increase, and network operability and reliability will decrease. There are increasing risks of asset deterioration that will require further prioritisation of those assets most in need of renewal.
- 3.12 The most significant business risks in terms of staff and customer injuries, customer experience, costs, revenue loss arising from journey time increases, and reputational damage are listed below and are mitigated through maintenance inspections and service restrictions if required:
- (a) ageing Lift and Escalator assets limiting station access (e.g., Holloway Road, Kentish Town) especially where these form the primary means of access;
 - (b) ageing communication systems (e.g., Jubilee Line Extension) in the event of incidents impacting our safety obligations and leading to station evacuations;
 - (c) Polychlorinated Biphenyls (chemicals) in power capacitors and other assets leading to increased risk and enforcement action by the Environment Agency; and
 - (d) Embankment, bridge, or tunnel failures resulting in service restrictions and wider asset damage.

4 Programme Delivery in 2021/22

- 4.1 The coronavirus pandemic and the resulting impact upon TfL's finances had a significant impact upon programme delivery, particularly in 2021/22, with supply chain issues, material shortages and internal resource constraints all contributing to delays on several projects. The total expenditure for this programme in 2021/22 was £68.5m against the revised budget (May 2021) of £68.0m. A summary by sub-programme asset group is shown in Table 2 below. There was a decline in spend during the height of the pandemic with stronger delivery performance in 2021/22. Figure 1 provides photographic evidence of delivery.

Table 2: Actual spend by year (£m)

Programme £m	2017/18	2018/19	2019/20	2020/21	2021/22
Sub-programme - Asset Group					
Systems - Lifts and Escalators	40.7	26.0	25.3	13.8	27.8
Systems - Power and Electrical	10.5	10.1	15.3	5.0	14.7
Systems - Mechanical, Fire, Comms	0.0	0.0	7.4	8.8	12.9
Building & Civils – Built Env. & Welfare	1.7	3.5	10.1	4.9	11.5
Safe Track Access	0.0	0.0	0.0	0.0	1.6
Programme Total	52.9	39.7	58.6	32.5	68.5

- 4.2 The State of Good Repair declined in 2021/22 due to reductions in funding related to the pandemic. This is evidenced in Appendix 1, Table 8 for Lifts and Escalators where there is quantitative data. In other areas asset data is less mature and the SoGR assessment has a higher degree of engineering assessment based on asset knowledge.
- 4.3 At the start of 2021/22 planned investment on the Programme was £83.8m but financial constraints revised this in May 2021 to a budget of £68.0m. An outturn of £68.5m was delivered against the revised budget demonstrating strong delivery performance during a challenging recovery from the pandemic. While some projects were paused in response to available funding, the Programme had a number of notable successes including: completion of critical platform to train CCTV that protects customers at the platform train interface; 19 significant Lift and Escalator renewals; 100 per cent milestone completion for future design work in the Civils and Structures area building a strong future work pipeline.
- 4.4 To ensure efficient and effective management of the Programme and to react to changes in asset condition in year adjustments to individual budget allocations were made. As a result of this the Programme was able to address seven Code 1 (legal compliance) and Code 2 (safety) concerns. However some milestones in de-prioritised programmes had to be rephased with a Tier 1 and Tier 2 milestone re-forecast to May 2022 (South Kensington Escalators and Hounslow West Lift) which are now complete.
- 4.5 Appendix 2 contains a full breakdown of this successful delivery by sub-programme in 2021/22.

Figure 1 – Key deliverables in 2021/22

South Kensington
5 escalator renewals including motor's
Daily Users – 45,712



Rickmansworth to Chorleywood
Embankment Strengthening
Daily users – 14,751



Neasden Depot
LED lighting in depot pit road
supporting 898,050 daily users



Waterloo
Bakerloo platforms new camera view to
enhance safety – daily users 70,070



Greenwich
Power & Electrical, static compensator
plinth to retain resilience and improve
safety, network daily users 6.8m



Chigwell to Grange Hill
Embankment Strengthening
Daily users 2,596



- 4.6 The TfL Capital Efficiencies Plan was developed in June 2021, this has focussed on driving efficiency and delivering ‘value for money’ across all programmes. Key examples of efficiencies delivered within this programme include savings through lift specification at Tottenham Hale (£140k), and through various savings in escalators (estimated at £322k). The delivery team converted six additional stations to LED lighting (estimated at £393k) with no increase in labour costs as a result of continuity of labour and process efficiency throughout the year.

5 Programme delivery for 2022/23

Option assessment

- 5.1 Several strategic options have been considered at the TfL level and are set out below. Due to funding constraints, we are working to Managed Decline:
- (a) **Managed Decline (Do Minimum minus 30 percent)** (this is the planned level of investment): The Managed Decline scenario reflects the £600m TfL budget for capital renewals in 2022/23 across TfL, but this is insufficient to meet the minimum asset condition. Under this scenario, asset condition will deteriorate, resulting in increased likelihood of restrictions and closures to keep the network safe. This will result in decreased reliability and increased operational expenditure. The backlog of renewals will increase in both scale and time to address it. Future renewals schemes are likely to need more extensive, and therefore costly, interventions. The approach to efficiently manage the programme is outlined below in paragraphs 5.2 and 5.3.
 - (b) **Do Minimum:** Maintains a basic level of service at minimum cost to maintain safety and operability. This option represents an absolute lower bound level of investment to hold level of state of good repair. This option will likely result in significant peaks in investment as some assets become unmaintainable through operating expenditure interventions and will require significant capital investment to keep assets safe and operable.
 - (c) **Moderate:** Aligns with the 2020 TfL Business Plan with amendments to account for coronavirus pandemic impacts on delivery in 2020/21. This can support the key themes of the MTS, however, at a slower rate and to a lower level of customer experience than the ‘High Ambition’ option.
 - (d) **High Ambition:** This scenario aims to deliver the proposals of the MTS. It prioritises walking, cycling and public transport. Areas of focus include supporting Vision Zero, and carbon reduction.
- 5.2 Given the high risks presented by the ‘Managed Decline’ scenario, TfL has implemented a prioritisation of work process consistent across Portfolios to deliver the best possible outcomes from limited funding. Projects have been categorised based on the criticality of the asset and impact of failure as follows:
- (a) “In-scope” projects aligns to the budget available and is the highest priority; and
 - (b) “Additional In-scope” represents additional scope that is higher priority and provides additional flexibility in-year should additional funding become

available from Government or other programmes and to reflect delivery risks.

- 5.3 Periodic reviews will be used to assess the level of delivery achieved, risks, and whether additional commitments can be made through Change Control. This approach gives maximum flexibility to target funds to deliverable priorities.

Table 3 – Planned spend (£m) by programme

Programme £m (values rounded)		In-scope	2022/23 Additional schemes if funding becomes available
Sub-programme & Asset Groups		2022/23 TfL budget	
Systems	Lifts & Escalators	23	5
Systems	Power & Electrical, Mechanical, Fire and Communications	32	8
Buildings and Civils	Built Environment & Civils	16	3
Safe Track Access		5	1
Total Programme Budget		76	17

- 5.4 The overall budget for TfL Capital Renewals is £600m for 2022/23. £320m of this is apportioned for the LU Renewals Portfolio including £76m for this Programme.
- 5.5 The request is to combine sub-programmes into a single Programme and Project Authority. This gives greater flexibility to manage the Programme and reduces the risk of delays from seeking revised Programme and Project Authority for sub-programmes, but the controlling factor is the overall Financial Authority and budget. Contractual controls will be used to delay projects if required to remain within budget. No additional Programme and Project Authority in 2022/23 and 2023/24 is requested to that previously approved.
- 5.6 The Programme delivers repeatable work. A top-down flat forecast of £107.0m per annum is shown in Table 6 (section 8.3) from 2023/24 to 2027/28 (inclusive), where this is 15 per cent higher per annum than in 2022/23, excluding inflation. Future work details will be presented in annual submissions and prioritised in accordance with our Asset Strategies. A proportion of future year's spend is contractually committed, with break points where they will be reviewed.

Benefits and value

- 5.7 Asset modelling and historic performance trends have been used to assess the SoGR achieved by the planned investment. Appendix 1 shows this specifically for Lifts and Escalators. Work on other assets is ongoing. The managed decline scenario will result in deteriorating asset condition and is expected to increase the backlog of renewals required for the network to comply with legal requirements and to keep the network safe. This means whole life costs and best value are unlikely to be achieved as investment will not be at the optimum.

Scope in 2022/23

- 5.8 Appendix 3 summarises a full list of planned renewals in-year with costs and brief descriptions and prioritised against our Asset Strategies. The work types include:
- (a) refurbishments and renewals of lifts and escalators;
 - (b) renewals of communication and fire systems to assist safety;
 - (c) renewals of power and electrical assets including cabling, and switchgears;
 - (d) renewals of tunnels, embankments, and other civils infrastructure.
- 5.9 Due to reduced funding a number of schemes had to be removed from the programme and are categorised as “not in scope”. They will be paused with an increased risk of asset failures, missed carbon reduction targets, increased maintenance costs, and risks for the delivery pipeline.
- 5.10 The programme delivery has been reviewed in detail for 2022/23, and there is high confidence that the planned work will be delivered. Close management of resources, existing contracts and programme risks, will be required as normal and should further funding become available an additional pipeline of opportunities is in place.
- 5.11 Many activities will continue beyond 2022/23 as they have project lifecycles beyond one year, with ongoing contractual commitments. The scope of work in 2023/24 will include schemes continuing from 2022/23 (shown in Appendix 3) and newly initiated projects that will be presented in the next annual submission.

6 Programme risks and milestones

Programme risks

- 6.1 Table 4 below shows top risks associated with delivery of the Programme to address asset resilience and a decline in the SoGR.

Table 4: Top risks for LU Renewals Programme

Risk No	Risk Description	Mitigation Actions
1	Reduced funding and increased materials cost affect objectives so we deliver less. Spending less than required under the LTCP. Declining SoGR increases risk of asset failure. Increased risk of asset failures resulting in the programme needing to be re-prioritised in-year	Prioritise projects on whole life cost and risk to ensure best value. Strengthen regular reviews. Develop greater asset health awareness through data collection to prioritise critical assets in line with our Asset Strategies
2	Lack of attractiveness to supply chain due to smaller contracts let on a case-by-case basis	Review commercial strategy within the duration of available funding
3	Resource levels in planning, delivery, and supporting teams and long lead times impacts delivery	Larger combinations to consolidate work may reduce supply chain uncertainty and make more efficient use of commercial resource. Regular deliverability reviews
4	Access to the network for delivery of works	Early engagement and co-ordination. Aggregate work in delivery to reduce overall disruption and cost
5	Maturity of Asset Strategies is variable. Data may be unreliable or incomplete.	Ongoing development of our Asset Strategies to identify data gaps and address these. Use tacit knowledge whilst Asset data matures

- 6.2 The Programme does not include a programme wide risk allowance so increases in costs above known and planned project risk need to be balanced by reductions or deferrals into future years. It is comprised of hundreds of schemes that, experience has shown, enable risk to be effectively managed across the programme using the workbank approach.
- 6.3 The strategic milestones for this Programme are shown in Table 5 below.

Table 5: Strategic Milestones Programme Milestones 2022/23

Project	Milestone Description	Date
UPS Control Centres	Commissioning of installed equipment at Hammersmith control centre to provide a stable, resilient power supply	13-02-2023
Asset Data Integrity Surveys – Tranche 1	Completion of asset condition data gathering for 91 stations	13-06-2022
West Acton Programme	Completion of improved lighting in ticket hall as part of West Acton station refurbishment and Completion of new tiling and decorations to ticket hall and stairs to platforms	20-06-2022
CO56 CTS4B Grange Hill to Chigwell	Completion of installation of concrete piles to strengthen railway embankment between Chigwell and Grange Hill	08-02-2023
RDP – Staff Welfare	Completion of phase one staff welfare improvement works to 14 operational locations	25-11-2022
Lift and Escalator Milestone 2022-23	Fourteen new escalators installed and brought into customer use	31-03-2023
Lift and Escalator Milestone 2022-23	Seven new escalators installed and brought into customer use	18-07-2022
PMVT Lift Refurb Borough PL 1 & 2	Borough station lift renewal and ticket hall enhancement complete	17-10-2022

7 Commercial Strategy

- 7.1 The Programme is predominantly delivered by our internal Direct Labour Organisation and by contractors using existing frameworks for rolling renewal interventions. These include the Pan-TfL Facilities contract and Lift and Escalator contracts covering capital and maintenance spend with the three main manufacturers. Where this is not the case specific procurement strategies are developed for each project and set out the selected route to market and how value for money can be identified during the procurement process and what benefits can be achieved.

8 Financial Implications

- 8.1 The 2022 TfL Budget provides the Financial Authority needed to deliver the scope of the works set out in this request. The Programme's Financial Authority and the Programme and Project Authority is shown in Table 6 below.

Table 6: Summary of the costs and funding

LU Infrastructure Renewals		Actuals	Budget		Forecast				Total	Future Years
Rounded to £m		Prior Years	22/23	23/24	24/25	25/26	26/27	27/28		
Financial Authority										
Budget	TfL Element	631	72							
Programme Forecast										
Plan	TfL Element		93	107	107	107	107	107	1259	
Authority request										
Prog. & Project Authority	Existing Authority	1192							1192	
	Additional Authority granted or requested	0	0	0	0	0	0	66*	66	
Future Authority Requests								66*	1259	

Notes – All future costs exclude Inflation; * request is subject to available funding

8.2 The current funding agreement with Government expires on 13 July 2022 but recognises that TfL will need to enter new financial commitments that extend beyond this date. Any Authority granted which relates to both the current funding period and commitments that extend beyond the period of the Business Plan and Budget may need to be revised as part of future budgets to be considered by the Board.

8.3 If additional funding is not available, a prioritisation of the TfL Investment Programme will be required, some programmes and projects will not be taken forward and revised authority will be sought as appropriate. All approvals given will be overseen in accordance with TfL Business controls in respect of draw down

9 Equality and inclusion

9.1 TfL has an obligation under the Equality Act 2010 to:

- (a) eliminate discrimination, harassment, victimisation, and any other conduct that is prohibited by or under the Equality Act 2010;
- (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and
- (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.

9.2 Most of the Programme is like-for-like renewals maintaining existing provision however we seek opportunities to improve access where possible in all projects. There are temporary impacts for customers during the delivery of works. Equality Impact Assessments will be completed on projects as required. A deteriorating SoGR, particularly in lifts and escalators, has a higher adverse impact on older and disabled customers.

10 Assurance

- 10.1 TfL Project Assurance conducted an Integrated Assurance Review (IAR) on the Programme in June 2022. There were four recommendations by the IAR. No critical issues were identified. IIPAG have made five recommendations. These observations and recommendations are all in line with the TfL view of the programme and we are grateful for the support from the additional assurance. Details of these recommendations and our Management Response have been shared with the Committee.
- 10.2 An agreed Integrated Assurance Plan (IAP) for the Programme, covering the next 12 months, has been produced that sets out those projects that are expected to be reviewed. The IAP will be reviewed and updated quarterly.

List of appendices to this paper:

Appendix 1: State of Good Repair

Appendix 2: 2020/21 actuals / forecast outputs

Appendix 3: 2021/22 budget allocations and outputs

List of Background papers:

TfL Project Assurance Reports

Management response to TfL Project Assurance Reports

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Appendix 1: State of Good Repair (SoGR)

A1.1 SoGR, where possible, is based on industry standard condition measures. SoGR helps inform prioritisation of interventions, although not in isolation (other factors, such as asset criticality, risk, safety, and service are considered alongside SoGR). TfL has mapped these industry measures to a consistent five category scale of asset condition – the condition categories are Very Good, Good, Fair, Poor and Very Poor. The percentage of assets in these categories is used to calculate SoGR, namely:

- 1) SoGR – the sum of the percentages in the Very Good, Good and Fair categories. These assets, in general, do not require planned asset renewal in the next one to three years, although in some instances it does reduce whole life costs to intervene when an asset is in the Fair category.
- 2) Not in a SoGR – the sum of the percentages in the Poor and Very Poor categories. Typically, these assets have a higher probability of failure and should be considered for a renewal within the next one-to-three-year period (subject to assessment through prioritisation processes).

A1.2 The current scorecard target for LU assets differs by asset type.

A1.3 Table A1 below provides examples based on currently measured LU assets.

Table A1: State of Good Repair – scorecard targets (*asset included in this Programme)

Asset*	SoGR Target 2021/22	SoGR Performance 2021/22
Signals	91%	91%
Escalators*	82%	82%
Track	76%	76%
Lifts*	71%	71%
Fleet	68%	68%

A1.4 Current scorecard targets are set based on an assumption that SoGR should be maintained based on current available investment. All assets are safety managed; where the SoGR is below the preferred range it reflects the need for renewals investment to deliver a reliable network and reduce the risk of restrictions and closures. Safety is maintained through appropriate inspections, minor repairs, and restrictions.

A1.5 SoGR in LU is calculated using a range of methodologies, primarily using data from Asset Condition Reporting. There are however some gaps across LU's asset base limiting our ability to calculate a total SoGR for LU. In these cases, other condition and asset health metrics are used to support prioritisation. Currently SoGR covers the following asset groups in LU; Track, Fleet, Signals, Escalators and Lifts and Buildings (approximately 75 per cent of the LU renewals investment programme). This makes comparison of condition using SoGR alone a challenge. A maturity plan has been developed with the aim of developing the data to inform a consistent approach to SoGR analysis across all asset areas that

make up LU's asset base. Work is ongoing to set targets in the maturity plan for 2022/23.

A1.6 Table A2 below shows data currently measures or forecast via modelling for the Lifts and Escalator asset types indicating trends referred to in paragraph 4.2.

Table A2: Current and Predicted State of Good Repair (per cent) – Lifts and Escalators

Asset	19/20	20/21	21/22	22/23	23/24	24/25	25/26
Lifts – SoGR existing asset base	74	73.5	70.7	69.4	68.1	66.9	65.6
Lifts – SOGR revised asset base				71.0	71.4	71.7	72.1
Lift Assets (no)	226	248	259	311	312	313	319
Escalators – SoGR existing asset base	85.6	83.6	82.1	78.8	75.8	72.8	69.8
Escalators – SOGR revised asset base				79.7	77.6	75.5	73.4
Escalator Assets (no)	458	458	463	524	526	526	529

A1.7 The modelling results for Lifts and Escalators reflects investment of £28.0m in 2022/23 and increased by 15 per cent for following years. For Escalators a declining overall trend is predicated both with and without additional assets to be installed. The position for lifts does show the overall SoGR is influenced by additional assets introduced (e.g. as part of Northern Line Extension) in addition to levels of investment. For the existing asset base for Lifts the SoGR is predicted to decline even with the future investment assumed, but the overall SoGR is improved when the new assets are taken into account. These forecasts will help inform prioritisation of investment decisions for renewals and allow benefits to be monitored against forecasts supported by performance data.

Appendix 2: 2021/22 actuals and outputs

Note: Whilst allocations and outputs for the year were part of the submission for the year 2021/22, they were reset by the TfL/DfT funding agreement as outlined in the letter from the DfT on 1 June 2021.

Sub-programme and Asset Group		July 2021 (post funding deal) (£m)	2021/22 actuals March 2022 (£m)	Expected outputs July 2021 (post funding deal)	Actual Outputs March 2022	Comments
Built Environment & Civils	Earth Structures	7.5	7.5	Start of 2 works on site	2 works started, 1 complete, 1 in progress, 1 design	Works started 100%
	Bridges and Structures	1.4	1.5	Manual Boarding Ramps (MBR) at 4 stations. Completion of 23 assessments Completion of 1 detailed design Contract award for 1 project	Manual Boarding Ramps installed at 2 stations. Completion of 23 assessments. Completion of 1 detailed design	MBR 50% Assessments 100% Design 100%
	Built Environment & Staff Welfare	1.3	2.5	Completion of 4 sites. 1 tranche of surveys completed another commenced	Completion of 4 sites. 1 tranche of data surveys completed, 1 commenced	100% completion
Systems - Lifts and Escalators	Primary Means of Vertical Transport (PMVT) Lifts	6.1	1.8	4	4	100% completion
Systems - Lifts and Escalators	Secondary Means of Vertical Transport (SMVT) Lifts	0.7	1.7	2	1	50% Hounslow West stairlift delayed due issues with the design/ location of the place of safety
	Pan-TfL Escalators	11.0	11.7	6	1 completion, 5 works started	17% completion of escalators at South Kensington delayed by 2 months due to issues with civils works
	Other Escalators	8.7	9.4	11	11	100% completion
	Preventative Maintenance Programme	2.7	2.1	6	5	83% - delivery of 1 escalator delayed due to issues with the controller (outside of the original scope)
	Other	1.0	1.2		200 Ultra Violet (UV) handrails completed	100% completion
Systems - Power &	Operation CCTV Obscured Views	1.0	1.0		Delivery completed	100% completion

Sub-programme and Asset Group		July 2021 (post funding deal) (£m)	2021/22 actuals March 2022 (£m)	Expected outputs July 2021 (post funding deal)	Actual Outputs March 2022	Comments
Electrical, Mechanical, Fire and Comms systems	Electrical	3.8	2.1	22 sites UPS replacement	11 sites complete	Supply chain issues continue, price rises for materials has slowed progress
Systems - Power & Electrical, Mechanical, Fire and Comms systems	Power Workbank	6.3	5.6	16 Traction isolation switches Holborn Direct Current (DC)switchgear Tender for replacement of 35 Battery Lighting (OLBI) Replace High Voltage (HV) switchgear at Greenford	16 Traction isolation switches Holborn DC switchgear Tender issued for replacement of 35 OLBI's Greenford switchgear at pre- commissioning	Holborn DC switchgear complete. Tender was unsuccessful for OLBI's due to no complaint bids. Greenford Switchgear project ran into issues.
	LED Replacement	3.7	3.6	20 planned	26 completed	Completed 130%
	Control upgrade	2.8	1.8	Factory acceptance testing, site acceptance testing	Factory testing completed	Prolongation and issues led to delays on site
	Bakerloo RVAR	0.4	0.6			
	Comms, Mech, and Fire	7.4	12.9	116 sites Fire Assessments	116 sites complete	Completions 100%
Safe Track Access	Signs, Mobile App	2.2	1.6	Design and delivery of signs, mobile app	481 signs delivered	Designs complete, 25% delivery. Mobile app started but paused
Total		68.0	68.5			

Appendix 3: 2022/23 budget allocations and outputs

Notes

- 1) This list reflects the latest view of the TfL renewals portfolio for 2022/23 as of 23/02/22
- 2) This list will be subject to change as deliverability and priorities continue to be assessed
- 3) Additional scope to progressed if funding becomes available.

Sub-Programme	Programme/Project	2022/23 Cost	Description	Target Measures
Built Environment & Civils	Earth Structures	9.8	Embankments, Walls etc to stabilise condition	Design and Build at 6 locations Design and build of renewals at a further 12 structures
Built Environment & Civils	Railway infrastructure - design and build	5.1	Design and Build of a mini-programme and platform works, depot works, and other works	Design and Build at 38 stations and other works at 7 locations, Design and Build at 1 depot Complete feasibility at 5 stations of asset renewals
Built Environment & Civils	Programme Management	1.0	Staff resource	Design and Delivery of the sub-programme for this asset group
Built Environment & Civils	Surveys, data collection, and assessment	2.8	Condition surveys to investigate the State of Good Repair for site where data is over 7 years old	Asset condition data and assessments to inform the State of Good Repair for identified assets
Built Environment & Civils	Staff Welfare	2.3	Design and Delivery of renewals of welfare facilities	Complete renewals at 12 locations, initiate design in other locations for future year delivery
Built Environment & Civils	Bakerloo RVAR	0.2	LED lights as part of Rail Vehicle Accessibility Regulations (RVAR)	Completion and close out of project
Lifts & Escalators	Contractual commitments for refurbishments	14.9	Renewals of escalators and Primary lifts under existing contracts	Escalator renewals at 10 stations, Lift renewals at 2 stations
Lifts & Escalators	Escalator renewals	6.2	Escalator components, controller parts	Escalator parts for 6 stations, controller spares for 3 stations
Lifts & Escalators	Renewals of Lifts and Escalators	1.9	Project mobilisation to start investigations.	Feasibility of Escalator renewals at 1 station, or Lift renewals at 1 station

Sub-Programme	Programme/Project	2022/23 Cost	Description	Target Measures
Lifts & Escalators	Lift Replacements	1.3	Design and Build of a programme of Lift replacements for Secondary Mode of Vertical Transportation to maintain asset performance	Design and build of a programme of Lift replacements to maintain asset performance
Lifts & Escalators	Innovative Escalator Replacement Programme	0.3	Escalator renewal using new approaches	Feasibility work to develop the future programme in line with plan
Power, Electrical, Fire, Mechanical & Comms	Workbank of Mechanical and Communication system renewal	21.5	Renewals of assets to maintain performance. Station communication upgrades of Public Address systems, help points, CCTV, Station Management systems. Improved surveillance for drivers of gaps at platforms for passengers boarding and alighting. Replace obsolete equipment. Renew ventilation systems, machine chambers, air control, heating and pump equipment.	Progress design and build of renewals at 9 stations in line with plan. Design and build to accelerate overall scope of renewals work at 8 stations. Feasibility, design and build work at 7 stations to improve visibility in line with plan (progress future design in line with agreed plan and additional scope if funding is available).
Power, Electrical, Fire, Mechanical & Comms	Workbank of Fire System assets	4.7	Renewals of existing hydrants and detection equipment to standards, scoping work to inform future design for renewing systems	Progress feasibility, design and renewal work in line with plan. Mini-programme for design and build of 8 depots or sidings and 24 stations for hydrant renewals.
Power, Electrical, Fire, Mechanical & Comms	Workbank of Power and Electrical assets	17.3	Legislative requirement to remove hazardous chemicals used in capacitors, replace obsolete/end of life equipment, improve power distribution, renew air circuit breakers, purchase spares, depot lighting	Progress Design and Delivery of works in line with plan
Safe Track Access	Safe Track Access	6.0	5 sub-projects: signs, permanent current rail indicator devise, access system, management system, and culture and behaviour.	Progress of design, delivery of trackside signs, commence tendering, in line with plan
Efficiencies	Contribution to overall efficiencies of £19m for LU Portfolio	-4.5	Efficiency savings	Efficiency savings realised on delivering the same overall programme

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Programmes and Investment Committee



Date: 20 July 2022

Title: East London Line Housing Infrastructure Fund Programme

This paper is public

1 Summary

- 1.1 This paper sets out the request for additional Financial Authority and Programme and Project Authority to continue the East London Line (ELL) Housing Infrastructure Fund Programme (the Programme). These works are primarily funded by the Housing Infrastructure Fund (HIF) and comprise infrastructure upgrades to the London Overground and London Bus networks.
- 1.2 This request follows Committee approval, by way of Chair's Action in June 2020, for TfL to enter into the HIF agreement with the Greater London Authority (GLA) and the Department for Levelling Up, Housing and Communities (the Ministry of Housing, Communities and Local Government as was) (DLUHC) and to progress the initial design stages of the Programme.
- 1.3 The focus of this paper is to:
 - (a) provide an overview of the progress made by the Programme to date, and the delivery strategy for the next phase;
 - (b) propose a phased approach for the Programme to ensure the 'Phase 1' scope remains affordable within available third party funding and the requisite changes to the TfL/GLA/DLUHC Housing Infrastructure Fund Grant Determination Agreement (GDA);
 - (c) present an update to the business case for the Programme based on the phased approach; and
 - (d) provide details on the financial implications and key risks for TfL from committing to the detailed design and implementation of Phase 1.
- 1.4 The paper included on Part 2 of this agenda contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

East London Line Housing Infrastructure Fund Programme					
	Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Authority**
Gross*	£82.85m	£77.7m	£8.76m	£82.09m	£92.65m
Income - HIF Funding	-£80.84m		-£8.76m	-£72.08m	-£80.84m
Income - S106 Funding***	-		£0m	-£11.82m	-£11.82m
Net****	£2.01m		£0m	£0m	£0m
Future Request*****				£71.79m	

Table 1: Summary of Programme and Project Authority Request

*Phase 1 and Phase 2 Preliminary Costs

** Includes £1.81m Programme and Project Authority for Canada Water bus station upgrade

*** £10m British Land Section 106 financial contribution (indexed for draw down from 2024/25)

**** £2.01m from separate Financial Authorities for TfL seed funding and signalling upgrade project

***** Current forecast based on assumed implementation of Phase 2; see Appendix A in Part B paper.

2 Recommendation

2.1 **The Committee is asked to note the paper and the exempt supplementary information and:**

- (a) approve additional unbudgeted Financial Authority of £92.65m for the receipt of funds and expenditure on infrastructure upgrades to the London Overground and London Bus networks within Phase 1 of the East London Line Housing Infrastructure Fund Programme;**
- (b) approve additional Programme and Project Authority of £82.09m for the design and construction of infrastructure upgrades to the London Overground and London Bus networks within Phase 1 of the East London Line Housing Infrastructure Fund Programme and further design activities for infrastructure upgrades to the London Overground within Phase 2 of that Programme; and**
- (c) note that Procurement Authority for the design of infrastructure upgrades to the London Overground and London Bus networks will be sought at officer level in accordance with Standing Orders.**

3 Background

- 3.1 In August 2019, DLUHC approved an £80.84m bid by TfL and the GLA to the HIF for a programme of works on and along the East London Line. The infrastructure upgrades (the ELL Scope) should unlock approximately 14,000 new homes.
- 3.2 Following negotiations with the GLA and DLUHC on the ELL HIF Grant Determination Agreement, Committee approval was sought to enter into the GDA and complete the early design stages of the ELL Scope. These early design stages are referred to in the GDA as the 'Preliminary Costs' phase. In June 2020, the Committee approved this request via Chair's Action.
- 3.3 In August 2020, TfL, the GLA and DLUHC completed the GDA and an associated side letter. At the same time, TfL and the GLA entered into a Memorandum of Understanding (MoU) setting out the key principles of how the parties would work together to facilitate the delivery of the ELL Scope. The aspects of the MoU relating to the allocation of cost risk are legally binding.
- 3.4 Separately, an agreement was signed by TfL with British Land in May 2020 for their Section 106 planning contribution of £10m (indexed) that will supplement the HIF funding.

4 Progress and phasing proposal

- 4.1 Good progress has been made on the ELL Scope since August 2020 with all project completing concept designs. Where issues have arisen, TfL, the GLA and DLUHC have resolved these via the processes established in the GDA and MoU.
- 4.2 The ELL Scope comprises the following six projects: Surrey Canal new station, Surrey Quay Station upgrade, Power and Signalling upgrades, Additional Train Stabling and an update to Canada Water Bus Station. Appendix A provides a summary of the scope of works associated with each project and the progress made to date during the Preliminary Costs phase. Two of the milestones under the GDA have been successfully achieved.
- 4.3 For the main three projects (Surrey Quays Station upgrade, Surrey Canal station, and Additional Train Stabling), main works contractors were appointed by TfL in July 2021 using TfL's new London Rail Improvements Framework. These contracts were awarded on a two-stage basis:
 - (a) stage 1: Early Contractor Involvement and development of concept design; and
 - (b) stage 2: Main Works delivery from detailed design to implementation.
- 4.4 Cost pressures were forecast from late 2021 based on the new concept design information and updated estimates across the main three projects. These pressures were predominantly driven by design development and construction industry inflation. To help manage this issue TfL and the GLA agreed with DLUHC that the original target to complete the Preliminary Costs phase would be deferred from October 2021 to July 2022.

- 4.5 Following conclusion of concept design activities, a revised estimated final cost (EFC) for the Programme of c.£166m was reported in March 2022 which was significantly in excess of the original EFC of £90.84m reported in June 2020 to the Committee.
- 4.6 In recognition of the considerable benefits that could be unlocked by the Programme, TfL and the GLA worked with DLUHC to develop a phasing proposal. This proposal was intended to allow use of the available funding to deliver key elements of the ELL Scope in a 'Phase 1', while deferring the remaining elements to a 'Phase 2'. Consequently, Phase 1 would remain affordable. The Phase 1 scope seeks to unlock the largest and most advanced development sites first, whilst also utilising the British Land Section 106 developer contribution.
- 4.7 The split of ELL Scope between both phases is summarised in Table 2 below. This is the basis upon which the investment appraisal and business case development has been undertaken for the Programme. Details on the EFC for each project is provided in the paper on Part 2 of the agenda:

Phase 1	Phase 2
Canada Water bus station	Surrey Canal new station
Surrey Quays Station Upgrade	Train stabling
Traction Power Upgrade	
Signalling Upgrade	

Table 2: ELL HIF Programme phases

- 4.8 DLUHC has agreed that Phase 2 will be included in a planned National Review of the HIF later this year through which TfL and the GLA would seek to agree further funding for its future delivery. £1m has been included in the Phase 1 EFC for activities associated with progressing Phase 2 through the DLUHC National Review. The EFC for Phase 1 also includes all Preliminary Costs expended to date on Phase 2.
- 4.9 Additional information on the rationale for the split of projects between Phase 1 and Phase 2 developed with the GLA and DLUHC is summarised in Appendix B. DLUHC endorsed the proposed phasing of the Programme (subject to subsequent confirmation of contractual amendments between parties) through a Cross-Whitehall Board meeting on 12 May 2022.
- 4.10 Changes to the GDA have been discussed and agreed in principle (subject to finalisation of terms and subject to the Authorities sought in this paper) with the GLA and DLUHC. These will enable the phasing of the ELL HIF Programme and the delivery of Phase 1 by enabling:
- (a) the agreed £80.84m of HIF funding to be available for the delivery of Phase 1 projects and completion of development work for Phase 2 (£1m);
 - (b) the 'Availability Period' for the draw-down of HIF funding to be extended to 31 March 2026;

- (c) the Preliminary Costs sum to be uplifted by £1m for activities associated with Phase 2 and the planned DLUHC National Review later this year; and
 - (d) The milestone dates for Phase 1 projects to be revised (those relating to Phase 2 projects will be updated following the outcome of the National Review).
- 4.11 Phase 2 continues to be referred to in the GDA with the same scope as described in the original GDA for the Additional Train Stabling and Surrey Canal station projects.
- 4.12 Following the Committee's review of this paper, TfL shall move from the Preliminary Costs phase into 'Detailed Design and Implementation' for Phase 1 projects.

5 Business Case

- 5.1 The objective of the Programme is to unlock new housing which aligns with the objectives of the London Plan. The delivery of Phase 1 also supports the objectives of the Mayor's Transport Strategy (MTS) and will also deliver significant transport related benefits for TfL. Prior to the pandemic, Jubilee line and ELL services to and from Canada Water experienced high levels of crowding. Without investment there is a likelihood of renewed and exacerbated levels of crowding given the planned housing delivery for the Canada Water area. The upgrade to Surrey Quays station has been developed to integrate with the adjacent British Land masterplan development for between 2,000 and 4,000 homes, leisure and new commercial floor space. Furthermore, the signalling and power upgrades will enable a service level enhancement to be implemented to accommodate future demand growth to ensure housing delivery is sustainable.
- 5.2 As such, Phase 1 supports the two key themes of the MTS that the Programme was established to deliver against. It will help deliver the 'New Homes and Jobs' theme of the MTS by unlocking c7,700 new homes; and it will also make a strong contribution to the 'Good Public Transport Experience' theme by enabling a future higher frequency train service on overcrowded routes and provide additional capacity and step free access at Surrey Quays station.

New homes and jobs

- 5.3 Phase 1 will unlock two of the largest strategic housing developments: the British Land development near Canada Water and Surrey Quays, and the Convoys Wharf development. These schemes will make significant contributions to borough housing targets, as well as London's overall level of housing delivery. They are also relatively more advanced compared to the other development sites identified by the GLA and TfL and included in the original HIF bid:
- (a) The British Land Canada Water Masterplan development site has outline consent for between 2,000 - 4,000 homes. Works have commenced on site for the first two development plots, with the first unit delivery anticipated in late 2023;

- (b) Convoys Wharf has Outline Planning Consent for between 3,500 homes. Full planning permission has been granted to deliver the first 580 homes, with site preparation and piling works currently underway on these plots.
- 5.4 The land value uplift (LVU) associated with the unlocking of new homes by Phase 1 has been assessed. A range of £267.4m-£534.8m (NPV) of LVU is forecast. This was derived from the £990m of LVU that was forecast for the Programme in 2018 for the HIF bid using the proportion of homes linked to Phase 1.
- 5.5 The range of 50-100 per cent reflects the inherent uncertainty in future land values, alongside the long-term impact of coronavirus pandemic. Furthermore, there is also uncertainty relating to the circumstances of third-party developers and their decisions to build-out the development sites identified in the HIF bid. However, some comfort on delivery and LVU can be gained given the two largest sites have secured detailed planning permission and are now on site with their first phases. The forecast £267.4m of LVU at the lower end of the range still exceeds the forecast delivery costs of Phase 1.

Good public transport experience

- 5.6 The concept design for Surrey Quays station includes a new station entrance. This will increase station capacity and has been developed to integrate with the surrounding area and the new British Land development. There will be decongestion and journey time savings for passengers alongside accessibility benefits from providing step free access from street to platform.
- 5.7 Increasing capacity at Canada Water bus station will provide the infrastructure for additional bus routes to connect the Convoys Wharf development to the public transport network, as well as meeting increased demand from the British Land development and other local developments. This will also realise journey time savings for passengers.
- 5.8 The Phase 1 power and signalling upgrade projects will enable TfL to uplift the London Overground service frequency on the ELL Core from 16 trains per hour (tph) to 18. The ELL Core is the section of the London Overground network between Dalston Junction and Surrey Quays.
- 5.9 Based on current demand trends this increase of two tph would operate between Clapham Junction and either Dalston Junction or Highbury & Islington. This will ensure sufficient train capacity to meet new demand from the housing developments, as well as realising journey time savings for new and existing passengers. Furthermore, the signalling works bring an improvement in operational resilience ahead of any increases in train frequencies.

Benefits and value

- 5.10 Table 3a **Error! Reference source not found.** below presents the business case assessment. Three Benefit to Cost Ratios (BCRs) are provided alongside that reported in the June 2020 submission to the Committee. The 'Baseline' BCR retains the same growth assumptions used for the HIF bid (pre-pandemic) and used for the BCR reported to the Committee in June 2020. A BCR using the post-pandemic 'Change to London' growth scenario is provided – which is

representative of the most recent 'Hybrid 2' growth scenario that TfL has developed. These BCRs include all costs to the public purse.

- 5.11 A 'TfL costs only' BCR is provided which presents the net costs that require funding over the lifetime of the investment by TfL. This deducts the public sector HIF funding contribution from delivery costs. Costs relating to the leasing and maintenance for the additional train units to implement the service level uplifts are also removed from the assessment as these have already been purchased by TfL. The resultant BCR assesses transport related benefits with the net costs to TfL (as opposed to all costs to the public purse) from delivering the projects and operating the new and enhanced transport infrastructure
- 5.12 The appraisal period is 60 years for the station works, 35 years for the 2 tph service uplift on the ELL to Clapham Junction and 25 years for the bus station works.

	Baseline	Baseline (June 2020)	Change to London / Hybrid 2	TfL costs only
Benefit to Cost Ratio (BCR)	1.35	1.88	0.91	3.42
Value for Money TAG Categorisation	Low	Medium	Poor	High

Table 3a: Summary of transport benefit BCRs

- 5.13 Table 3b below presents sensitivities that include the LVU described above (paragraph 5.5). The £267.4 (Low) to £534.8m (High) range of additional benefits is included in this instance against the Change to London / Hybrid 2 scenario for both all costs to the public purse, and for TfL costs only:

BCR Change to London / Hybrid 2	LVU range	
	Low	High
All costs to public purse	3.1	5.3
Value for Money TAG Categorisation	High	Very High
TfL costs only	7.1	12.2
Value for Money TAG Categorisation	Very High	Very High

Table 3b: Summary of BCRs incorporating LVU

- 5.14 When LVU is excluded and all costs to the public sector are included, the BCR for Phase 1 offers Low Value for Money for the Baseline demand, or Poor Value for Money when Change to London / Hybrid 2 demand is used. However, if only net costs to TfL are included the BCR improves significantly.
- 5.15 Furthermore, if the LVU associated with the delivery of the new housing is included (Table 3b) the BCRs offer High or Very High Value for Money with the Change to London / Hybrid 2 demand. The underlying rationale for the

Programme is to enable new housing delivery and this is why DLUHC have agreed to making HIF funding available for Phase 1. In light of this, it is reasonable to incorporate LVU into the assessment of Value for Money and conclude that Phase 1 offers Value for Money.

6 Delivery Strategy

- 6.1 The contractual milestones for the Phase 1 projects have been revised and are included in the Part B paper. Milestones relating to Phase 2 projects will be settled with the GLA and DLUHC following the National Review of HIF later this year.
- 6.2 The procurement routes for the ELL scope remain the same as advised in June 2020. For Phase 2 projects, the main works contractors will continue to be used to support the DLUHC National Review. The expectation is that updated Contract Prices will be sought later in 2022 when there is more funding certainty for Phase 2. A submission will be made to the Committee requesting the appropriate authorities prior to committing to Detailed Design and Implementation for Phase 2.

Risks and considerations from phasing of the ELL HIF Programme

- 6.3 The phasing of the Programme means that there is no contractual commitment from DLUHC to fund (fully or in part) the delivery of Phase 2. This means that there is uncertainty regarding funding support for the delivery of Surrey Canal Station and the Additional Train Stabling.
- 6.4 This creates the following risks for TfL and GLA:
- (a) Performance: without the Additional Train Stabling there is an increased risk that TfL will be unable to operate a reliable 20tph ELL service to accommodate post-pandemic demand.

The Phase 1 signalling upgrade will, however, support the resilience of rail operations as soon as it is implemented; and

- (b) Reduced housing delivery: approximately 6,600 homes are linked to the delivery of Surrey Canal station. If overcrowding of London Overground services occurs TfL/GLA would need to seek to limit housing numbers for unconsented development sites or when determining amendments to planning consents.

Key risks and considerations for Phase 1

- 6.5 The primary risk for TfL from committing to the delivery of Phase 1 is that it will take on the delivery and cost risks for the Phase 1 projects and will be obliged to deliver them on behalf of DLUHC. TfL will need to deliver the project in line with its obligations in the GDA including the need to achieve the specified delivery Milestones for each Phase 1 project.
- 6.6 Were TfL to not achieve the contractual milestones it could be found to be in 'General Default' under the GDA by DLUHC and would need to repay all HIF

funding contributions to DLUHC. Further details on the risks to TfL are detailed in the Part 2 paper.

7 Financial Implications

7.1 The Part 2 paper provides the full financial overview for Phase 1.

Cashflow impact

7.2 We will receive the HIF funding on a quarterly basis for completed works and may for the fourth quarter claim HIF funding is provided in advance. There is also scope in the GDA to claim the HIF funding on a monthly, rather than quarterly, frequency should this be required.

8 Assurance and Governance

8.1 The TfL Project Assurance team conducted an assurance review of the Programme in November 2021 and in May 2022. These reviews were supported by members of the Independent Investment Programme Advisory Group. These reviews made six recommendations of which none were critical. These reports are attached to this submission to the Committee along with the TfL's Management Response.

8.2 Recommendations were made relating to the status of the Programme's current management information and the need to update project documentation and Pathway products to reflect the phasing of the Programme. Given that there was limited confidence in DLUHC's commitment to the phasing proposals up until 12 May 2022, work to update such documentation has only recently commenced.

8.3 Table 4 below provides a forward look to when the Gates for the Programme and individual project will be undertaken at which point the necessary updates to such documentation shall be made. This is reflected in TfL Management Response to the Assurance Review.

Programme	Stage A	Stage B	Stage C	Stage D		
ELL HIF Programme	Feb -20	Aug -22	Oct-25	Dec-25		
Project						
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6
Surrey Quays Station	Aug-19	Aug-19	Jul-22	Sep-23	Sep-25	Nov-25
Power Upgrade (TfL)			Sep-22	Aug-23	Aug-24	Oct-24
Power Upgrade (NR)			Jan-23	Aug-23	Jan-25	Apr-25
Signalling Upgrade				Feb-20	Jan-24	Feb-24

Table 4: Planned Pathway Gates

8.4 The ELL Scope will be addressed in the Public Transport Programme for the rail elements, and the Surface Assets Programme for the bus station. Risk drawdowns and other change requests (such as re-allocating funding from one

project to another) up to individual values of £2m will be governed through TfL. Any request to reallocate funding from one project to another that exceeds £2m will require review and approval from DLUHC.

- 8.5 DLUHC will conduct their own assurance of the design and delivery of the ELL Scope via provisions set out in the HIF 'Assurance Framework' that is appended to the GDA.

9 Equalities Implications

- 9.1 Phase 1 will improve accessibility on the ELL via the delivery of a new step-free entrance at Surrey Quays station. An Equality Impact Assessment was produced during the Concept Design stage in accordance with TfL's obligations under the public sector equality duty in the Equality Act 2010.
- 9.2 The other Phase 1 projects shall enable future service level uplifts on the London Overground and London bus networks. Any required Equality Impact Assessment shall be undertaken when those service changes are planned for implementation.

List of Appendices

Appendix A – Summary of progress on ELL HIF projects

Appendix B – Rationale for phased approach

List of Background Papers

Project Assurance Report

Management Response to the Project Assurance Report

ELL HIF Part 2 paper

June 2020 paper to the Committee

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Appendix A – Summary of progress on ELL HIF projects

Project	Scope	Progress
Surrey Quays Station Upgrade	<p>A new second entrance to the existing London Overground station at Surrey Quays, including:</p> <ul style="list-style-type: none"> • Ticket hall and passenger footbridge • Two customer lifts (one to each platform) • Platform extensions 	<p>The land has been acquired, achieving a GDA milestone</p> <p>The concept design has been completed and outline planning permission granted</p> <p>A construction compound agreement has been signed with British Land, who are developing the adjacent Canada Water site</p>
Surrey Canal New Station	<p>A new station between Surrey Quays and Queens Road Peckham, including:</p> <ul style="list-style-type: none"> • Ticket hall • Two customer lifts (one to each platform) • Platforms suitable for five-car trains 	<p>The feasibility design and concept design has been completed and detailed planning permission granted</p> <p>A construction compound agreement has been signed with Renewal, who are developing the adjacent New Bermondsey site</p>
Additional Train stabling	<p>A new stabling and train preparation facility to house additional trains for a future 20 trains per hour (tph) service level on the ELL Core</p>	<p>The feasibility design and concept design has been completed.</p>
Traction power upgrade	<p>A traction power upgrade and resilience work on the ELL and South London Lines as an enabler for any service level upgrade from the current 16tph on the ELL Core</p>	<p>Feasibility design on the Network Rail infrastructure has been completed by Network Rail.</p> <p>Concept design on the ELL infrastructure has been completed</p>
ELL Signalling Upgrade	<p>A contribution to upgrade signalling as an enabler for any service level upgrade from the current 16tph on the ELL Core</p>	<p>No activity since June 2020: the detailed design for this project was completed in May 2020</p>
Canada Water Bus Station Upgrade	<p>A capacity upgrade at Canada Water Bus station to serve new demand from nearby developments</p>	<p>The concept design has been completed</p>

Appendix B: Rationale for phasing of ELL HIF Programme

1.0 The phasing proposal developed by TfL and GLA responded to three main considerations:

- ensuring affordability and availability of funding;
- aligning interventions and scope to unlocking development sites that were relatively more advanced to realise housing benefits to stakeholders; and
- addressing existing and anticipated public transport capacity issues.

1.1 The estimated final costs of the six ELL HIF projects are not similar in scale. The three main projects (Surrey Quays Station Upgrade, Surrey Canal station, and Additional Train Stabling at Edwards Street) are much larger than the other three projects (Traction Power, Signalling and Canada Water bus station).

1.2 It was not possible to progress two of the main projects within the available funding. Consequently, the development of the phasing proposal focused on which main project should be progressed in Phase 1.

1.3 The Surrey Quays Upgrade Project was subsequently included due to its link to the British Land Masterplan Canada Water development site which:

- is the largest development site identified in the HIF Bid (c3,400 homes across all sites in the catchment of Surrey Quays station);
- is among the more advanced development sites included in the HIF Bid and therefore more likely to unlock earlier the housing benefits anticipated by DLUHC; and
- will secure the £10m (indexed) Section 106 funding contribution.

1.4 The impact of the delivery of the development sites on Surrey Quays will be significant. - the forecast increase in demand by 2031 would raise Surrey Quays from 89th to 16th when ranking the volume of weekday station entries at stations in zones two and three. Pedestrian modelling undertaken to date has demonstrated that the existing station design cannot accommodate the increased level of demand forecast with the development.

1.5 Furthermore, the existing Surrey Quays Station lacks step free access which will be provided through the Surrey Quays Upgrade Project. A recent exercise conducted by TfL to select the best stations on the National Rail network for the provision of step free access (out of those currently without this facility) ranked Surrey Quays as the twelfth highest priority out of 137 stations reviewed.

1.6 The inclusion of Surrey Quays Station Upgrade Project into Phase 1 left adequate funding for the three smaller projects. These projects also aligned with the key considerations noted above:

- Canada Water bus station is required for the delivery of Convoys Wharf which is consented, and among the more advanced development sites included in the HIF Bid;
- The signalling and power upgrades will enable a service uplift to 18 tph on the ELL Core. This marginal increase in train service capacity will ensure public transport capacity can accommodate and benefit existing passengers and new demand associated with the Canada Water and Convoys Wharf development sites.

Programmes and Investment Committee



Date: 20 July 2022

Title: Public Transport Programme

This paper will be considered in public

	Existing Financial Authority (to 2023/24)	Existing Programme and Project Authority 2022/23 and future years	Additional Authority Requested 2022/23 & 2023/24	Total Authority	Prior Years	Forecast 2022/23 to 2027/28	Total Forecast
Gross	£629m	£499m	£49m	£548m	£394m	£554m	£948m
Income	£118m	£33m	- £6m	£27m	£18m	£39m	£56m
Net	£511m	£466m	£55m	£521m	£377m	£515m	£892m

Table 1: Summary of Programme and Project Authority Request to 2023/24

1 Financial Authority is based on approved budget to 2023/24

2 EFC exceeds Financial Authority as it extends to 2023/24 and 2024/25, with these later years containing significant construction activities

3 Minus figure (Third Party Income) is due to programme delivery for Royal Docks and London Overground Enhancement delivery profile to 2023/24.

1 Summary

1.1 This paper sets out the request for Programme and Project Authority for the continuation of the Public Transport Programme (the Programme) until the end of 2024/25. The Programme will maintain the safety, operability and reliability of the surface public transport network through the delivery of a prioritised programme of planned and reactive renewals.

1.2 The focus of this paper is to:

- (a) update the Committee on the progress of this Public Transport Programme since the previous submission in 2020/21;
- (b) summarise the financial allocations by mode across the Programme for 2022/23 and 2023/24, demonstrating how the spend aligns with the asset strategy for each Public Transport mode; and
- (c) note that a request for Programme and Project Authority for the East London Line (ELL) Housing Infrastructure Fund (HIF) programme is presented in a separate paper.

1.3 The Programme will return annually to the Committee for Authority approval.

- 1.4 Financial Authority is currently provided through the two-year Budget for 2022/2023 and 2023/2024, approved by the Board in March 2022. The current funding agreement with Government expired on 13 July 2022. Any Authority requested by this paper which relates to both the current funding period and commitments that extend beyond the period of the Business Plan and Budget may need to be revised as part of future budgets to be considered by the Board.
- 1.5 If additional funding is not available, a prioritisation of the TfL Investment Programme will be required, and some programmes and projects will not be taken forward and revised authority will be sought as appropriate. All approvals given will be overseen in accordance with TfL Business controls in respect of draw down.

2 Recommendation

2.1 The Committee is asked to note the paper and:

- (a) approve additional budgeted Programme and Project Authority of £54.9m for the continuation of the Public Transport Programme through to the end of 2023/24; and**
- (b) note that the matters for which Programme and Project Authority is sought include commitments that extend beyond the period of the current Budget and appropriate provision will, therefore, need to be made for those commitments in future Business Plans and Budgets.**

3 Background

Strategic Context

- 3.1 The Programme supports the delivery of all three key themes of the Mayor's Transport Strategy (MTS): healthy streets and healthy people; a good public transport experience; and new homes and jobs. Maintaining a state of good repair on the public transport network is essential to delivering all these themes as almost all journeys on London's transport system interact with it. This is particularly important to ensure that renewal of critical assets takes place to maintain a safe, reliable, and operable public transport network.
- 3.2 The Programme's funding has been substantially reduced to £61m in 2022/23 from the 2019/20 level of £97m due to the Government removing TfL's revenue grant. In addition, the coronavirus pandemic has had a significant impact on our ways of working and revenue streams. This reduction ensures the affordability of the programme within the overall £600m allocation for the Capital Renewals Budget across TfL.
- 3.3 The budget available to Capital Renewals is 30 per cent below a "do minimum" scenario needed to maintain the current condition of the assets. Consequently, TfL's assets are now subject to a "managed decline" scenario and it is forecast that the asset condition will decline in 2022/23.

Public Transport

- 3.4 The Public Transport Programme consists of the following transport modes: the Docklands Light Railway (DLR), London Overground, London Trams, Cable Car (Emirates Air Line up until June 2022), Cycle Hire renewals, Woolwich Ferry and specific projects in London Buses.

Asset Duties and Responsibilities

- 3.5 Renewals are planned through 25-year work banks that are maintained and refreshed annually by TfL's Engineering and Asset Strategy teams. Schemes in the first three years are consistently prioritised using a value model that is not determined by asset type or engineering discipline. The prioritisation process ranks schemes in order of importance to the mode. The outputs from the prioritisation process are peer-reviewed by TfL's Engineering, Asset Operations and Asset Strategy teams.

Maintaining assets in a State of Good Repair (SoGR)

- 3.6 State of Good Repair describes the condition in which TfL seeks to maintain assets to provide a safe and reliable network that minimises whole life costs and, where appropriate, meets customer expectations. The SoGR is based on industry standard condition measures which differ by asset type. Where the SoGR is below the preferred range it reflects the need for renewals investment to deliver a reliable network and reduce the risk of restrictions and closures. The percentage of assets in these categories is used to calculate SoGR.
- 3.7 Target ranges across TfL typically range between 85 per cent and 95 per cent. Figure 1 below illustrates key asset areas where SoGR measurements are in place for the whole asset group and demonstrates key areas where we are well below comparable condition scores. The 'Poor' score obtained by the London Trams fleet is reflected in declining service availability.

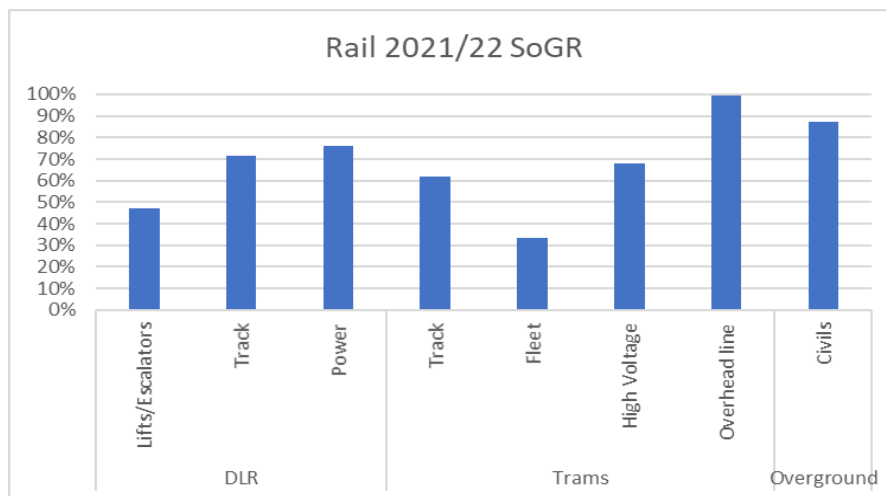


Figure 1: State of Good Repair where in place for key asset groups

Obsolescence concerns

- 3.8 Obsolescence is an increasing concern as well, especially on assets which contain software such as the DLR signalling system. The equipment was the forerunner to later systems installed on the London Underground. We are working with the supply chain to identify how best to keep these systems in an operational condition as parts and software become increasingly difficult to support.

Impact on Operations

- 3.9 The impact of managed decline investment is causing concern with the reliability of the original fleet of London trams. There are now regular shortfalls in the availability of trams for passenger service. The passenger service is always maintained and operated in a safe condition.
- 3.10 Another asset group that has declined below standard without investment are DLR's lifts and escalators. Over the next two years a substantial programme of renewals and overhauls is planned.

4 Programme Delivery in 2021/22

- 4.1 The coronavirus pandemic and the resulting impact upon TfL's finances had a significant impact upon programme delivery, particularly in 2021/22, with supply chain issues, material shortages and internal resource constraints all contributing to delays on several projects. As a result, overall Programme spend was £59m against an outturn of £71m. However, the situation is improving, and increasing use of new framework contracts is made to improve performance with suppliers.
- 4.2 The Programme consists of over 300 renewals projects (including one project for London Buses) and ten enhancement projects, around a third of which have been paused due to funding constraints. Tables 2a and 2b below set out the in-year performance for renewals and enhancements in 2021/22 for this programme.

Renewals	2021/22 Financial Authority (£m)	Full Year Spend (£m)	Variance (£m)	Performance Update
Bus	1.2	1.1	0.1	New Routemaster refurbishment buses now rolling out into service and battery replacement completed
Cable Car	0.7	0.6	0.1	Annual overhaul successfully completed, with savings of £0.1m
Cycle Hire Projects	3.6	2.6	1.0	Replacement bikes purchased but experienced up to 12 months delay in delivery of orders due to global demand for bikes and shortage of parts as a result of the pandemic.
DLR	29.6	27.8	1.8	Ramp up of delivery from last year with renewals completed as planned: Track, escalator refurbishment, Lift refurbishment, station automatic counter renewal, platform surfaces, footbridge stairs and landing replacement, demarcation barriers, power renewal, signalling and rolling stock renewal. A series of maintenance possessions were utilised to make best use of access with the maintainer and a large proportion of the works were completed through night working. At Custom House to support the opening of the

Renewals	2021/22 Financial Authority (£m)	Full Year Spend (£m)	Variance (£m)	Performance Update
				Elizabeth Line the escalators were refurbished, and stations systems integrated with the Elizabeth Line station
London Overground	10.9	6.0	4.9	Civils, signalling, track, systems and power renewals were completed by the maintainer as planned. Some delay in delivery and in aligning improved pathway and assurance process. Operational facilities and Cab simulator renewals initiated and procured
Woolwich Ferry	2.04	1.12	0.92	Since transfer to TfL operation in 2021, increasing asset failures have triggered a full review of asset condition and reprioritisation of the renewal and resilience programme. The portfolio is at a low level of maturity and resources are being put in place to develop and deliver. Marine guiderail renewals, fender renewals and a new mooring system have been completed.
Trams	11.7	10.9	0.8	Key embedded rail renewals at Reeves Corner and Addiscombe Road were completed as planned in a series of blockades. Other renewals completed as planned; rerailling, vehicle incursion works, rolling stock upgrades, structures renewals and power renewals. The installation of the signalling to enable correct side door enabling is in progress but there has been some delay during integration to deal with some faults. Mitcham Ballasted Track Renewal and CR4000 Tram Fleet overhauls were significantly delayed due to resource constraints and delivery postponed to 2022/23.

Table 2a: Public Transport (extract) 2022/23 performance against plan by mode - Renewals

4.3 Since the last submission to the Committee, a review of TfL funded enhancements has been undertaken in terms of affordability and most enhancement projects in this programme. This has resulted in the pausing of most TfL funded enhancements including the Croydon Capacity Study and Rail and Sponsored services feasibility pipeline development. The only significant TfL funded enhancements that continued were the Bus Customer Action Plan and the Tram Replacement programme.

Enhancements	2021/22 Financial Authority (£m)	Full Year Spend (£m)	Variance (£m)	Performance Update
Bus	8.1	2.2	5.9	Bus safety programmes were completed for existing Intelligent Speed Assistance (ISA) retrofit phase and Acoustic Vehicle Alerting System AVAS paused due to managed decline
DLR (Royal Docks third part funded)	1.7	0.3	1.4	Programme now working to revised scope agreed with funders following re-start in September 2021. Concept design activities for enhancements for Pontoon Dock and Royal Victoria stations progressed in 2022/23
London Overground	12.0	7.2	4.8	ELL HIF Programme paused until re-scope agreed by third party, which is addressed in a separate paper on this agenda.

Enhancements	2021/22 Financial Authority (£m)	Full Year Spend (£m)	Variance (£m)	Performance Update
				Also included close out of West Hampstead station build.
Trams (Trams Replacement Project and Sandilands)	2.6	3.6	1	Sandilands improvements have been affected by delays, the power and tunnel lighting works are now progressing.

Table 2b: Public Transport (extract) 2022/23 performance against plan by mode - Enhancements

- 4.4 In 2021/22, an efficiency target of £3.4m was set, and we achieved a total efficiency saving of £2.1m. Savings were identified in the DLR Renewals, Cable Car and the Trams Renewals programmes.
- 4.5 Since the last submission, six milestones have been delivered, with one delivered eight days late on the ELL HIF Project design works. Another one was postponed by six weeks to reduce customer delays from a line closure required on DLR and Network Rail tracks.

5 Planned Delivery for 2022/23

- 5.1 Several strategic options have been considered and are set out below. Due to funding constraints, we are working to 'Managed Decline':
- (a) **Managed Decline (Do Minimum minus 30 per cent)** This is the current planned level of investment: The Managed Decline scenario reflects the £600m TfL budget for capital renewals in 2022/23 across TfL, but this is insufficient to meet the minimum asset condition. Under this scenario, asset condition will deteriorate, resulting in increased likelihood of restrictions and closures to keep the network safe. This will result in decreased reliability and increased operational expenditure. The backlog of renewals will increase in both scale and time to address it. Future renewals schemes are likely to need more extensive, and therefore costly, interventions.
 - (b) **Do Minimum:** Maintains a basic level of service at minimum cost to maintain safety and operability. This option represents an absolute lower bound level of investment to hold level of state of good repair. This option will likely result in significant peaks in investment as some assets become unmaintainable through operating expenditure interventions and will require significant capital investment to keep assets safe and operable.
 - (c) **Moderate:** Aligns with the 2020 TfL Business Plan with amendments to account for coronavirus pandemic impacts on delivery in 2020/21. This can support the key themes of the MTS, however, at a slower rate and to a lower level of customer experience than the 'High Ambition' option.
 - (d) **High Ambition:** This scenario aims to deliver the ambitions of the MTS. It prioritises walking, cycling and public transport. Areas of focus include supporting Vision Zero, and carbon reduction.

- 5.2 This paper requests approval of additional budgeted Programme and Project Authority to continue Programme delivery to 2022/23. An overview of the planned Programme of renewals projects is presented in Table 3 below by mode. On DLR, a high proportion of the planned expenditure reflects the issues raised in section 3 relating to the obsolescence of equipment. The situation on London Overground shows a focus on civils and power works. On London Trams, the investment is dominated by track and fleet investment that reflects the age and condition of these assets reach the end of their design lives.
- 5.3 A pan-TfL working group has provided improved visibility of pipeline opportunities, and the new procurement framework will enable earlier contractor involvement in project planning and estimating to support these submissions for third-party funding.
- 5.4 Appendix 2 contains the list of works in this Programme for 2022/23, which is summarised in Table 3 below by sub-programme. Projects have been categorised based on the criticality of the asset and impact of failure as follows:
- (a) “In-scope” projects align to the budget available and is the highest priority;
 - (b) “In-scope a” represents additional scope that is higher priority and provides additional flexibility in-year should additional funding become available from Government or other programmes and to reflect delivery risks;
 - (c) “in-scope b” also represents additional scope but is of lower priority; and
 - (d) “Not in scope” projects are paused.
- 5.5 Periodic reviews will be used to assess the level of delivery achieved, risks, and whether additional commitments can be made through Change Control. This approach gives maximum flexibility to target funds to deliverable priorities.

Programme	Number of Projects	Value
DLR	97	£40.0m
Trams	92	£19.5m
Overground	95	£9.1m
Woolwich Ferry	15	£4.0m

**Table 3: Summary of Project Volumes by mode for 2022/23
(Rail & Woolwich Ferry projects only)**

Public Transport Enhancements – Planned Delivery

- 5.6 In 2022/23, the outstanding initiatives from Sandilands programme will be progressed and completed in response to Rail Accident Investigation Branch recommendations following the Sandilands overturning in November 2016.
- 5.7 Following single option selection in autumn 2022, Tram Replacement Rolling Stock will start concept design including related depot and infrastructure modifications. After single option selection, we plan to commence the initial stages of the fleet replacement procurement process.

Royal Docks Station Upgrades

- 5.8 For Pontoon Dock, a tender has been let for Approval In Principle for concept design which will be completed in 2022. For Thames Wharf New Station, consultants have been appointed to review and amend the station design to ensure it is compatible with the revised masterplan for the Thameside West development.

Surrey Quays Station Upgrade

- 5.9 Funding from the Department for Levelling Up, Housing & Communities was approved for Phase 1 of the ELL HIF Programme for which the main constituent project is Surrey Quays Station Upgrade. Following detailed design in 2022 works are programmed to commence implementation in spring 2023.

Bus Renewal and Enhancement – Planned Delivery

- 5.10 The New Routemaster mid-life renewal refurbishment will continue with funding approval secured for 200 buses to be completed by the end of 2022/23. Planning work continues for a further 50 refurbishments to be completed within 2022/23 subject to the required financial authority being granted.
- 5.11 Almost 3,000 buses have been fitted with ISA or in the process of being fitted with ISA. The remainder of the fleet will receive ISA through the bus renewal cycle by 2032. However, the rate of roll out of ISA may be increased as an additional 1,800 buses are in scope for retrofitting the technology should further funding become available. The rate of delivery may also benefit from other policy levers such as increasing the number of zero emission buses in the fleet.
- 5.12 The Bus Customer Action Plan is focused on completing the delivery of new format bus stop bus information screens on route 63 during the summer of 2022 and the rollout of a further 211 Countdown bus arrival information signs at bus shelters London wide. A further 110 Countdown signs are to be installed in 2022/23. A proportion of these signs will be installed across central London to support customer journeys affected by the proposed bus route changes. The programme will also undertake qualitative and quantitative customer research into the measures implemented.

6 Programme Milestones and Risk

- 6.1 The strategic milestones are shown in Table 4 below. The first of these is the Mitcham to Mitcham Junction track renewal which was achieved on schedule.
- 6.2 For 2022/23 the programme has five relevant strategic milestones. The first milestone was completed in May 2022 and the remaining five milestones remain on track.

Project	Milestone	Target Date
Mitcham to Mitcham Junction	Phase 1 Ballast Renewals Brought into use.	30-Apr-22
1121 and 1122 points	Completion of Works – Brought into use	31-Jul-22
On Board Computer Accommodation (Train Simulator)	Start on Site	10-Nov-22
Tram Replacement Rolling Stock Programme -	Gate 2 Option Selection Review	20-Dec-22
Pontoon Dock DLR Station Upgrades	Concept Design Complete	15-Mar-23

Table 4: Strategic Milestones

6.3 The Programme does not include an overall high-level risk allowance. It is comprised of hundreds of schemes that, experience has shown, enable risk to be effectively managed across the programme using the workbank approach described. Periodic reviews of the Programme risks are held, with escalations reported at a Programme-wide review meeting. On larger projects risk is held at project level. Table 5 below shows the top risks associated with delivery of the Programme.

Risk No	Risk Description	Mitigation Actions
1	Resource shortages including difficulties in recruitment, retention and relevant skills sets	The biggest risk to deliverability is the resource capacity and capabilities to deliver the projects. The Programme is taking an agile approach to resource management and over-programming delivery against spend as mitigating actions, but this remains a constant challenge.
2	Reduction of CAPEX Funding limits delivery of project objectives.	Projects within Programme robustly prioritised based on whole life cost and risk to ensure best value. Delivery focused on highest priority asset need. Proactive management of costs and identification of efficiencies is ongoing
3	Reduction of opportunities for third party funding will limit delivery of programme objectives	The relationship with third party funding providers in form of GLA and Government is maintained at director level to ensure existing bonds are strengthened
4	Volatility in material costs leads to increase in overall costs	Advance purchase of materials where possible. Regular forecast of future demand to allow supply chain to plan efficiently, building relationships with Tier 1 suppliers to obtain early notice of potential price increase
5.	Possessions, closures and blockades not granted or cancelled at short notice	Use of possession planning meetings, sharing of information and scanning for works that other projects are undertaking to ensure that there are no conflicts with other projects and stakeholders that could lead to cancellation

Table 5: Top risks from Surface Public Transport Programme

7 Financial Implications

- 7.1 The approved Budget to 2023/24 provides the Financial Authority needed to deliver the scope of the works set out in this request. The request as it relates to the Programme's Financial Authority is shown in Appendix 1.
- 7.2 Existing Programme and Project Authority comprises £499m approved in the last annual submission to the Committee plus £8.53m approved by the Committee under Chair's Action in June 2020 for the East London Line Housing Infrastructure Fund.
- 7.3 An efficiency target of £3.7m has been assigned to the Programme for the financial year 2022/23.

8 Equality and Inclusion

- 8.1 TfL has an obligation under the Equality Act 2010 to:
- (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act 2010;
 - (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and
 - (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.
- 8.2 Most of the Programme is like-for-like renewals and, as such, maintains the existing provisions. The lower State of Good Repair (SOGR) may have a negative impact on two groups: older and disabled customers, therefore the programme to improve SOGR is expected to benefit both these groups. Equality Impact Assessments will be completed on projects as required, for example for DLR's replacement Ticket Vending Machines.

9 Programme Assurance

- 9.1 TfL Project Assurance conducted an Integrated Assurance Review (IAR) in June 2022. An independent review was also undertaken by the Independent Investment Programme Advisory Group. There were five recommendations from the IAR and 5 from IIPAG with no critical issues were identified. Details of these recommendations and our Management Response have been shared with the Committee.
- 9.2 An agreed Integrated Assurance Plan (IAP) for the Programme, setting out the projects that are expected to be reviewed in the 12 months, has been produced. The IAP will be updated quarterly.

List of appendices to this report:

Appendix 1: Detail of Programme and Project Authority Request to 2022/23

Appendix 2: List of Projects included within this Submission

List of Background Papers:

Independent Investment Programme Advisory Group Report

TfL Project Assurance Report

Management response to IIPAG and TfL Project Assurance Reports

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Appendix 1- Detail of Programme and Project Authority Request to 2022/23

Public Transport	Current Financial	Current P&PA Authority	Additional P&PA Authority	Authority Request (£m)								
	£m	£m	£m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2017/18 to 2023/24*
Renewals	394	339	73	34	31	47	55	50	81	114	86	412
Management Overlay/Efficiencies	-77	-45	-31	0	0	-2	2	0	-19	-56	-41	-76
Net Renewals	317	294	42	34	31	45	57	50	62	58	45	336
Enhancements	313	214	0	67	34	53	9	14	16	20	44	213
Management Overlay/Efficiencies	-1	-19	7	0	0	0	0	0	-2	0	-6	-2
Net Enhancements	312	204	6	67	34	53	9	14	14	20	39	211
TOTAL	629	499	49	101	65	98	66	63	76	78	83	548

The above reference the existing Financial Authority for the period 2017/18 to 2023/24, and additional Programme and Project Authority required to 2023/24 as split by Renewals and Enhancements

Appendix 2 – List of Projects included within this Submission

The following list contains the detail of this request, including individual detail of those projects¹ in the Programme which are forecasting expenditure of £1m or more between 2022/23 and 2023/24² (pending approval of the request set out in this submission).

Excludes works on the East London Line Housing Infrastructure Fund. £8.10m Programme and Project Authority was approved in June 2020, and a subsequent paper to the Committee is included elsewhere on this agenda.

Sub-Programme	Programme/Project	2022/23 Expenditure £m	Description	Target Measure
Public Transport Renewals	Docklands Light Railway	38.9	DLR Workbank Projects and Targets Include: 1. Mid-Life Refurbishments for B2007 Trains 2. Improve B2007 Refurbishment of Train Remote Diagnostics 3. Replacement (Signalling) Transmission Network 4. Replacement of Station Controllers 5. Renewals for New Trains Programme Interface 6. Ticket Vending Machine Replacement	1. Develop Project Requirements and Complete Survey Work for Mid Life Refurbishment in 22/23 2. Train Remote Diagnostics in 22/23 Feasibility work to be completed and put out to tender and appoint a contractor ready for design work in 23/24 3. Transmission Network to go into Concept Design (Stage Gate 3) 4. For Station Controllers- Gate 2 and Award Contract 5. New Trains Programme to develop in line with new DLR Rolling Stock as required. 6. Award contract in 22/23
	London Trams	19.9	Trams Renewal Workbank Track renewal rolling programme including Church Street and Rooftop Cross-Car Cabling	1. Complete Mitcham to Mitcham Junction further phases 2. Contract award for Cross-Car Cabling (CR4000 Tram Fleet)
	Sponsored Services	3.5	Cable Car Renewals Workbank Cycle Hire Renewals Workbank	
	Bus	3.9	New Route Master Refurbishment	200 Buses to be refurbished
	Other Transport Renewal Projects	5	Woolwich Ferry Resilience and Renewal	Complete Resilience Systems and Data project

Sub-Programme	Programme/Project	2022/23 Expenditure £m	Description	Target Measure
Public Transport Renewals	London Overground	9.6	Overground Renewals Workbank Projects and Targets Include: 1. A new Cab Simulator for new drivers and updating Operating Building Complex (OBC) Accommodation 2. Baseplate solution for Thames Tunnel corrosion issues 3. Wall 642 (Surrey Quays) investigate wall strengthening 4. Silwood Warehouse Replacement 5. West Anglia Renewals Workbank	<ol style="list-style-type: none"> 1. Delivery of new OBC in 22/23 along with new software and hardware for Cab Simulator 2. Investigation works to be completed for Thames Tunnel Baseplate corrosion issues in 22/23 3. Produce a Requirements Specification for W642 4. New renovation of Silwood Warehouse working with contractor Cleshar supporting their delivery of contractual obligations. 5. Address dilapidations on platform surfaces, staircases and canopies.
	Public Transport Renewals Sub-Total (excluding management overlay and value engineering.)	81.3		
Public Transport Enhancements	Docklands Light Railway	2.7	Royal Docks Station Upgrades (2.4) Third party funded.	Complete concept design for Pontoon Dock, revise feasibility study and re-estimate costs for Thames Wharf New Station and go out to tender for detailed design and implementation for Royal Victoria
			Beckton Depot Shed Closeout (0.2)	Safety remedial works need to be closed out. Gantry works were completed three years ago but have not been fully functional due to safety defects. The scope of this work is to rectify these defects to make the gantry fully operational (delayed by Covid)
	London Overground	1.8	West Hampstead Station Closeout (0.9)	Contractual commitment. Project Closeout Works following delivery of new station.
			London Overground Capacity Improvement Programme (LOCIP) (0.8)	Contractual commitment. Project Closeout Works and Final Invoicing

Sub-Programme	Programme/Project	2022/23 Expenditure £m	Description	Target Measure
			Other Closeout Projects	Project Closeout works for: Willesden Electrification Upgrade Hackney Central White Hart Lane Station Capacity Upgrade
	London Trams	4.2	Tram Replacement Rolling Stock	Complete single option selection and commence concept design
			Trams Sandilands Upgrades	Further safety enhancements to the Sandilands tunnel lighting system Deployment of safety enhancement to provide Correct Side Door Enabling on the CR4000 Trams Fleet Full roll-out of iTram speed warning alerts
	Bus	6.9	Bus Customer Action Plan	Introduce of new bus stop information including additional gate-line signs.
	Public Transport Enhancements Sub-Total	16.2		
	Public Transport Management Overlay and Value Engineering	(22)		
	Grand Gross Totals	75.7		

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Programmes and Investment Committee



Date: 20 July 2022

Title: Surface Technology Programme 2022/23

This paper will be considered in public

1 Summary

Existing Financial Authority (2022/23 to 2023/24)	Existing Programme and Project Authority 2022/23 and future years	Additional Authority Requested	Total Authority	Prior Years (2021/22)	Forecast 2022/23 to 2027/28	Total Forecast (2021-22 – 2027/28)
£123.2m	£138.9m	£15.2m	£154.1m	£30.6m	£358.1	£388.7

Table 1 Summary of Programme and Project Authority

- 1.1 This paper updates the Committee on the progress of the Surface Technology Programme (the Programme). Table 1 shows that £15.2m additional Programme and Project Authority (P&PA) is requested.
- 1.2 The Programme consists of renewals projects required to ensure operations within Surface Transport retain the technology capabilities to operate safely and efficiently. It also contains a small number of enhancements projects which support this aim within the Managed Decline scenario. Projects are within three key focus areas: Roads Technology, Compliance, Enforcement and Safety (CES) Technology, and Public Transport (PT) Technology.
- 1.3 The focus of this paper is to:
 - (a) provide an update on the Programme’s activity since the previous submission to the Committee in October 2021, proposed transfer of scope into and out of the Programme, and an overview of planned investment in 2022/23; and
 - (b) request £15.2m of additional Programme and Project Authority for the Programme, to cover delivery in 2022/23 and commitments in future years.
- 1.4 Financial Authority is currently provided through the two-year Budget for 2022/23 and 2023/24, approved by the Board in March 2022. The current funding agreement with Government expires on 13 July 2022. Any Authority granted which relates to both the current funding period and commitments that extend beyond the period of the Business Plan and Budget may need to be revised as part of future budgets to be considered by the Board.

- 1.5 If additional funding is not available, a prioritisation of the TfL Investment Programme will be required, some programmes and projects will not be taken forward and revised authority will be sought as appropriate. All approvals given will be overseen in accordance with TfL Business controls in respect of draw down.
- 1.6 A paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from the meeting.

2 Recommendations

- 2.1 **The Committee is asked to note the paper and exempt supplemental information in the paper on Part 2 of the agenda, and:**
- (a) **approve £15.2m Programme and Project Authority for the Surface Technology Programme, taking cumulative authority to £154.1m;**
 - (b) **approve transfer of the Innovation Fund out of the Programme into operating expenditure, which has no impact on the Programme's Programme and Project Authority;**
 - (c) **note that the matters for which Authorities are sought above include commitments that extend beyond the period of the 2022/23 Budget and provision will, therefore, need to be made for those commitments in future Budgets; and**
 - (d) **note that Procurement Authority for the various initiatives will be sought at officer level in accordance with Standing Orders.**

3 Background

- 3.1 The Mayor's Transport Strategy (MTS) sets out a vision that TfL "will work to ensure its information systems and payment platforms take account of technological advances and evolve to remain fit for purpose". (Proposal 102). TfL's response to the MTS sets six priorities, including: "to exploit technology to produce better and faster results".
- 3.2 The Programme provides a holistic overview of operational technology projects being delivered for Surface Transport. Historically, levels of investment in technology across Surface Transport were insufficient to keep pace with developments in technology, or to avoid technical debt across silo-based systems. The Programme provides a robust structure to support increased levels of investment in technology in the coming years which enable many pillars of the MTS including Healthy Streets, Vision Zero and enhancing customer experience.

Asset Strategy – Maintaining assets in a State of Good Repair

- 3.3 Figure 1 below demonstrates the improvements that investment is making to the health of technology systems within Surface Transport. The health of the Surface Technology estate depends on technology systems and their components being

supported (resource is available to fix issues as they arise to agreed service levels) and within contract where supplied externally.

3.4 Each system’s state of health is assessed yearly, and scored as follows:

- (a) **‘Green’** where all components are supported, and an agreed technology roadmap is in place. Optimum state of health, where systems should spend most of their serviceable life;
- (b) **‘Amber’** where one or more component is out of support/contract. Sub-optimal state of health, tolerable for systems approaching the end of their serviceable life; and
- (c) **‘Red’** where systems are exposed to technical risks and/or most components are out of support/contract. Intolerable at any point of system life cycle for those which are critical for safety / operations / legal compliance, tolerable only towards end of life for less critical systems.

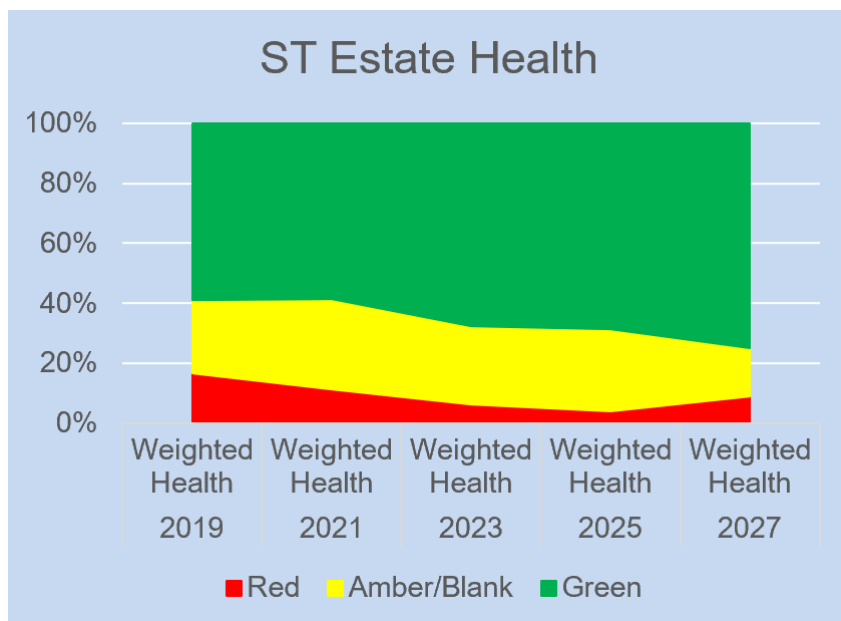


Figure 1: Indicative health of Surface Technology estate – Managed Decline scenario

3.5 The technological health of each system used in Surface is assessed and tracked over time. Because the importance of each system to TfL outcomes varies, a weighting is given based on its criticality, size and complexity. The overall technological health score is the total of the weighted scores as a percentage of what the total would be if all systems were assessed as Green. Overall technological health is expected to increase from 73 per cent in 2019 to 84 per cent by 2027, with an 18 per cent increase in those systems assessed as Green (to 61 per cent). This improvement is required to ensure TfL’s exposure to risk of system failure remains limited to systems which are not critical for safety, operations, and/or legal compliance.

3.6 If levels of investment are not sustained, systems risk remaining in a poor state of health. This has already exposed TfL to intolerable risks, some of which have already materialised in outages to critical systems. While work to include and address these in critical systems receives the highest priority for funding, there will remain operational risks until this work is delivered. For example, the system

used to maintain communication between the Network Management Control Centre and bus drivers. While these outages in this example have remained short-term and recoverable without significant impact to bus passengers, the system's poor health gives no guarantee that a longer duration outage, impacting passengers, will not occur before the system is renewed in August 2022.

- 3.7 Current levels of investment ensure systems now within the Surface Technology portfolio will be sufficient to avoid significant risks to safety, operations, and/or legal compliance, in line with the Managed Decline scenario previously described to the Committee. Lower, or slower investment than planned would increase TfL's exposure to failure of systems which are needed to secure these outcomes, within a short timescale. While it is difficult to quantify time until system failure with any certainty, risk of legal non-compliance (from e.g. failure to procure replacement contracts prior to existing contract expiry) could be expected to arise within a period of months of any reductions to available funding.
- 3.8 The Managed Decline scenario in which the Programme is currently operating funds only the very few enhancements required to secure legal compliance or future financial sustainability. Any additional funding would significantly improve outcomes from enhancements projects which are currently paused, in key areas like reducing delay for road users, particularly people who want to walk and cycle. While not required to maintain existing safety levels, additional funding would also improve Work-related Violence and Aggression (WVA) reporting and case management to better support colleagues who unfortunately do experience WVA, and ensure colleagues who are not at the highest risk of WVA have access to personal safety devices like body worn video cameras.

4 Programme Delivery 2021/2022

- 4.1 The Programme consists of over 50 renewals projects and 16 enhancements projects, of which nine have been paused due to funding constraints. Projects fall within the following categories: Roads Technology; CES Technology, and Public Transport Technology. Appendix 1 sets out scope and key activities for key deliverables in each area.

Financial Performance 2021/22

- 4.2 The coronavirus pandemic and the resulting impact upon TfL's finances had a significant impact upon programme delivery, particularly in 2021/22, with supply chain issues, material shortages and internal resource constraints all contributing to delays on several projects. For this programme, projects were actively paused in line with the Managed Decline scenario which also reduced spend. In early 2022, the Programme was re-prioritised to meet only Managed Decline outcomes in light of the current funding deal. Funding is no longer held for projects which are not essential to maintain current levels of safety, operational continuity or financial sustainability, including improvements to operational staff safety (for example, improved WVA reporting and case management), SITS Predictive and Data Analytics, Bus Station Security, the Assisted Transport Strategy Roadmap and Cycle Hire Expansion.

- 4.3 The approved Programme and Project Authority in 2021/22 was £48.1m; the Programme delivered an outturn of £30.6m. Key causes of underspend were slower supplier spend, delay to securing needed resources, more time than forecast required to complete feasibility stages, and deferral of projects not in the Managed Decline scenario. Table 2 below describes the 2021/22 performance for this Programme in detail.
- 4.4 In addition, resource constraints have caused mobilisation delays and backlogs. While in some cases, re-programming of activities has sometimes ensured that critical path activities (such as replacement of life-expired systems / contracts) can proceed with no increase to overall estimated final cost (EFC), this has deferred delivery of some benefits where these are not on the critical path. Securing the necessary resources remains a key risk, as detailed in section 6.2 below. Projects will be re-prioritised in-year if shortages become more acute.
- 4.5 Programme maturity and optimism bias also contributed to underspend, with an improvement programme including enhanced first-line assurance and training on risk including profiling risk budget. A review of the drivers for underspend concluded that the majority of early-stage projects tend to over-estimate how quickly Feasibility activities could be completed, contributing to underspend. While this delays delivery, it ensures benefits are protected by allowing sufficient time to define scope to the required quality. This contributed to exceeding the 2021/22 efficiency target of 5 per cent (£2m), with £2.6m efficiency savings delivered in-year. High-quality scope definition allowed clarity of scope with suppliers and fewer unforeseen changes.
- 4.6 To better reflect maturity, a workbank management approach has been applied to this programme. A larger volume of projects are started in the early lifecycle phase to maximise delivery and programme outputs.

Table 2: Performance update across key focus areas

	21/22 Forecast Spend (£m)	21/22 Full Year Spend (£m)	Variance (£m)	Performance Update
Roads Tech	15.6	10.2	-5.4	<p>Delay to delivery of SITS Common Operational View Incident Management System (COV-IMS) (£2.2m slippage). Delivery extended from spring 2022 to spring 2023. Slower supplier spend owing to additional development time required to complete baseline scope (budgeted within requirements). Minimum viable product still on track for delivery prior to decommissioning of existing system; delay to benefits.</p> <p>More time than forecast required to complete feasibility stages for projects including Network Information Systems (£1.8m slippage). Additional time ensures scope definition is of required quality, protecting benefits.</p>
CES Tech	14.4	6.2	-8.2	<p>Delay to securing needed resources on projects including Enforcement & Compliance Operations System (ECOS) (£4.4m slippage; delivery schedule adjusted to maintain critical path for delivery by May 2023), Operational Staff Safety (£1.2m slippage; delivery of enhancements benefits delayed), and Surface Technology Video Solution (£1.4m slippage).</p>

				Deferral of projects not in Managed Decline, including Compliance, Policing, Operations and Security (CPOS) Enhanced Data (£1.5m deferral). As projects are currently paused, delivery of benefits is uncertain.
PT Tech	22.8	14.1	-8.7	<p>Slower supplier-spend than predicted on projects including Cycle Hire Modernisation (£3.3m slippage)</p> <p>More time than forecast required to complete feasibility stages for projects including Bus Station Connectivity (£1.7m slippage). Additional time ensures scope definition is of required quality, protecting benefits.</p> <p>Deferral of contract award on Emirates Air Line Passenger Communication Systems due to concern over quality of delivery proposed by supplier (£1.8m) has delayed delivery but protected benefits.</p> <p>Deferral of projects not in Managed Decline, including Cycle Hire Expansion (£1.1m) and Pan-TfL Bookings. As projects are currently paused, delivery of benefits is uncertain.</p>
Efficiencies	-2.0	-2.6	+0.6	More efficiencies delivered than expected, due to lower supplier costs and reduced risk exposure for Deployable Enforcement Cameras (DEC) (£1.2m), lower supplier costs than estimated for the London Driver Information System (LDIS) upgrade (£0.4m) and lower spend than anticipated on unforeseen changes required to the Surface Technology estate (£0.7m).

Surface Technology Programme Key Achievements

- 4.7 Following a review of the Programme by the Committee in October 2021, projects have achieved key milestones supporting our benefits including:

Table 3: Key achievements

(a) 50 Deployable Enforcement Cameras (DECs) were deployed across our road network from December 2021 to May 2022, following the successful trial in 2020. These cameras will improve driver compliance, supporting road safety by avoiding an estimated three collisions in which someone is killed or seriously injured per year, and reducing congestion. We are now commencing the next stage which will assess costs and benefits of delivering of up to 350 more cameras.

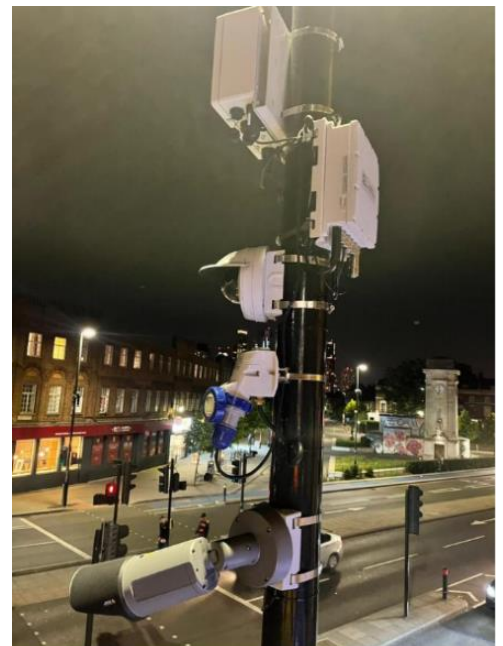


Figure 2: Deployable Enforcement Camera on the A24 at Stockwell

(b) In December 2021, the fourth release of the SITS Common Operational View – Incident Management System (COV-IMS) was deployed. This is already allowing our Network Management Control Centre to respond more quickly to unplanned incidents on London’s roads. The new system improves situational awareness and response, with this release making it easier to work with partners including highways management contractors to detect and respond to incidents. Faster incident detection and more coordinated response reduces delays and increases capacity on the road network, and in turn improves journey times. Once the system is fully delivered by the end of 2023, traffic incident detection time should improve from an average of 11 minutes to almost instantaneous, and response time should improve from an average of 15 minutes to five minutes.

The overarching Business Case for the SITS Programme was also reviewed this year. The benefit : cost ratio has improved from 3.3:1 to 4.8:1, to ensure baseline time taken to respond to incidents includes time required to take effective action. Previously, this had used time taken to, for example, view incidents on CCTV.

.1 We launched a 12-month trial of e-scooter rental services in June 2021 as part of the Department for Transport national trials, which has recently been extended until November 2022.

In collaboration with London Councils and ten participating London Boroughs, the trial is providing the opportunity to collect data on this transport mode, all while providing a sustainable and socially distanced travel option. Safety is at the heart of TfL’s e-scooter trial, with standards which go beyond the national standards, including a speed limit of 12.5mph, larger wheels and lights that are always on throughout any rental.

The UK Government has announced its intentions to legalise and regulate e-scooters in the future, and the trial findings will help to inform future legislative standards.



Figure 3: E-Scooters

Changes to the Surface Technology Programme since the last submission to the Committee (October 2021)

4.8 This request seeks approval to transfer the Innovation Fund out of the Programme, into the Innovation Directorate’s Operational Expenditure budget. This fund was established to explore innovative solutions to key strategic issues; and has already explored uses for data to understand near misses for vulnerable road users, women’s safety and energy usage in depots. This transfer reflects the pre-project, research and development-based nature of the work. As there were no commitments beyond 2021/22 included in previous authority requests, this transfer does not alter existing authority.

- 4.9 Table 4 below sets out the history of the forecast spend across focus areas since the previous submission.

Table 4: Forecast spend history

	This paper Forecast cost 2021/22 - 2025/26 (£m)	October 2021 Forecast cost 2021/22 - 2025/26 (£m)	Change (£m)	Rationale
Roads Technology	96.6	97.8	-1.2	Removal of projects not funded in Managed Decline (Surface COV), slippage on others (e.g., Network and Information Systems, Remote Monitoring)
Compliance, Enforcement and Safety Technology	80.8	84.7	-3.9	Scope reduction – removal of scope duplicated elsewhere or not yet instructed (e.g. Revenue Inspection Devices). Removal of enhancements not funded in Managed Decline, or where benefits are limited.
Public Transport Technology	228.5	261.1	-32.6	Removal of projects not funded in Managed Decline, including Assisted Transport Services (ATS) Roadmap and Digital Signs. Slippage of iBus2 contract award and re-profile to reflect expected spend to completion in 2026/27
Overprogramming / Efficiencies	-16.1	-26.7	10.58	Covers current financial year only. Lower Overprogramming / Efficiencies were applied last October (Q3) as this was later in the financial year.
Total	389.7	424.4	-34.7	

5 Investment Plan 2022/23 – 2023/24

- 5.1 As detailed in section 3, projects have been categorised based on the criticality of the asset and impact of failure as follows:

Option assessment

- 5.2 Several strategic options have been considered at the TfL level and are set out below. Due to funding constraints, we are working to Managed Decline:
- (a) **Managed Decline (Do Minimum – 30 per cent)** (this is the planned level of investment): The Managed Decline scenario reflects the £600m GLA budget for capital renewals in 2022/23 across TfL. While it is sufficient to renew systems required for safety or compliance and ensures renewals budgets meet TfL’s minimum legal obligations for timely contract re-let under procurement regulations, performance of less critical systems will deteriorate, compromising efficiency across operational areas. Enhancements which would significantly improve benefits and value for money of renewals expenditure are also paused.

- (b) **Do Minimum:** Maintains a basic level of service at minimum cost to maintain safety and operability. This option represents an absolute lower bound level of investment to hold level of state of good repair. This option will likely result in significant peaks in investment as some assets become unmaintainable through operating expenditure interventions and will require significant capital investment to keep assets safe and operable.
- (c) **Moderate:** Aligns with the 2020 TfL Business Plan with amendments to account for coronavirus pandemic impacts on delivery in 2020/21. This can support the key themes of the MTS, however, at a slower rate and to a lower level of customer experience than the 'High Ambition' option.
- (d) **High Ambition:** This scenario aims to deliver the ambitions of the MTS. It prioritises walking, cycling and public transport. Areas of focus include supporting Vision Zero, and carbon reduction.

5.3 Given the high risks presented by the 'Managed Decline' scenario, TfL have implemented a prioritisation of work process consistent across Portfolios to deliver the best possible outcomes from limited funding. Projects have been categorised based on the criticality of the asset and impact of failure as follows:

- (a) "In-scope" projects aligns to the budget available and is the highest priority; and
- (b) "Additional In-scope" represents additional scope that is higher priority and provides additional flexibility in-year should additional funding become available from Government or other programmes and to reflect delivery risks. This is reflected in the P&PA requested in this paper.

5.4 Periodic reviews will be used to assess the level of delivery achieved, risks, and whether additional commitments can be made through change control. This approach gives maximum flexibility to target funds to deliverable priorities.

Key Surface Technology Programme deliverables in 2022/23

5.5 Key deliverables planned during 2022/23 include:

- (a) releasing the Invitation to Submit Final Tender (ISFT) for iBus2 procurement, in winter 2022/23. This back-office system is vital to ensure buses continue to operate effectively in London, as it is fundamental to bus scheduling, providing real time information to customers, and ensuring performance-related payments to bus operating companies (around £2bn per year) are accurate. Refreshing it gives an opportunity to improve bus passenger experience with targeted enhancements, including real-time information when a bus cannot follow its normal route and linking virtually to traffic lights at more junctions to help buses travel more quickly, prioritising sustainable transport;
- (b) launching 500 assisted peddling electric bikes (e-bikes) into the Santander Cycles fleet in summer 2022, offer more flexibility for customers and support future financial sustainability. The rollout of e-bikes and new tariff is supported by the transition to a new, modern back-office system, which will

make it easier for customers to hire bikes via the Santander Cycles app or using a QR code; and



Figure 4: The new Santander Cycles e-bike

- (c) renewal of systems which provide CPOS colleagues with the tools to deliver enforcement and compliance across London, including a mobile app which officers use to ensure taxis are operating safely, in line with TfL and national standards. This app will work with the new Taxi Operating Licence Application software that is to be introduced by December 2022.

Financial Plan 2022/23

- 5.6 The Programme will return to the Committee in March 2023 to validate a rolling two-year approval which will be for 2023/24 and 2024/25. £42.7m of the £154.1m Programme and Project Authority sought would fund activities planned for 2022/23, compared to the £44.5m budget for this year.
- 5.7 While uncertainty over longer-term funding remains, approval for £80.8m for future financial years is sought, to cover existing or planned commitments before the Programme returns to the Committee in March 2023. Of this £80.8m, £46.5m is attributable to commitments in 2023/24, and a further £34.3m to committed spend in future years, predominantly for systems in Roads Technology including the Surface Intelligent Transport System (SITS) programme. Further details on commitments are included are shown in Appendix 1.
- 5.8 This extends beyond the period of the Business Plan and Budget. Appropriate provision will, therefore, need to be made for those commitments in future Business Plans and Budgets.
- 5.9 The funding request for 2022/23 includes a five per cent efficiency target (£2.4m), to encourage savings and drive towards value for money. Opportunities to deliver savings include reduced risk exposure through careful risk management, close management of scope and requirements, and working with suppliers to deliver projects more efficiently.

Table 5: Phased and Project breakdown (all figures in £m outturn values)

Costs and Funding (£m)	21/22	Current year22/23	yr+1 23/24	yr+2 24/25	yr+3 25/26	yr+4 26/27	yr+5 27/28	Total all years
Financial Authority	34.9	44.5	78.7					158.1
Existing Authority	48.1	68.6	15.7	3.6	2.1	1.0		138.9
Previous Committee Submission - £138.9m	48.1	68.6	15.7	3.6	2.1	1.0		138.9
Current Submission - £154.1m	30.6	42.7	46.5	28.4	4.4	1.0	0.5	154.1
This Authority Request	- 17.4	- 25.9	30.9	24.8	2.3	0.0	0.5	15.2
Roads Technology	- 5.4	- 3.7	11.0	10.5	1.8	-	0.5	14.7
Compliance, Enforcement and Safety Technology	- 7.0	- 13.8	16.5	10.8	-	-	-	6.4
Public Transport Technology	- 8.6	7.7	3.4	3.6	0.5	-	-	6.5
22/23 Forecast management overlay	3.1	- 13.8	-	-	-	-	-	- 10.6
2022/23 Forecast – Efficiency	0.5	- 2.4	-	-	-	-	-	- 1.9
Total Programme and Project Authority	30.6	42.7	46.5	28.4	4.4	1.0	0.5	154.1
Future Authority Requests	-	-	29.3	45.3	48.9	52.4	58.8	234.7
Total EFC (Gross) - P3 Forecast	30.6	42.7	75.8	73.7	53.3	53.4	59.3	388.7

6 Delivery Plan

6.1 The Programme has four Scorecard milestones for 2022/23 which are shown in Table 6 below:

Table 6: Scorecard milestones

Project	Milestones	Achievement Criteria	Target Date	Forecast Date
Cycle Hire	Launch of e-bikes for hire	500 E-bikes available for hire	31-Aug-22	18-Jul-22
ECOS	Complete the development of the TPH Compliance App	ECOS system running fully integrated with new TPH Taxi and Private Hire Operational Licensing Administration system and business processes in live environments and in the field	15-Dec-22	03-Nov-22
iBus2	ISFT Released	Publication of the ISFT to bidders	27-Feb-23	16-Jan-23
DEC	86 Deployable Enforcement Cameras installed	Installation of 36 additional deployable enforcement cameras across London's road network	29-Mar-23	15-Feb-23

6.2 Securing the necessary resources remains a key risk. As referenced in the Technology and Data (T&D) submission to the Committee titled 'Technology-and-Data 22/23 and 23/24' in March 2022, all technology projects rely on key technical resources for which there are ongoing challenges in retention and recruitment. The interventions detailed in that paper to the Committee are ongoing, and the projects within the Surface Technology Programme have fed clear and detailed resource forecasts into T&D's overall delivery planning.

6.3 There are further risks to delivery and project costs owing to market volatility and inflation, with a potential for an ongoing impact to operational costs following energy price increases. Where possible, we are working with suppliers to understand items with long lead times as early as possible and are reviewing risk allocation for future spend where inflation could impact cost. Significant increases in supplier, supply chain or raw materials costs, along with uncertainty over funding availability for longer-term capital investment, could result in further deferral of projects, compromising key capabilities for Surface Transport operational areas.

7 Programme Benefits

7.1 The Programme contributes to the following strategic benefits:

Table 7: Programme Benefits

Programme Benefit	Description	MTS benefit
Safe continuation of services	Ensuring that the IT supporting the Surface element of TfL's services continues to operate safely and consistently, compliant with legislation. All renewals projects contribute significantly.	Quality Public Transport, Safe, Efficient Road Network
Reduced casualties (Vision Zero)	Contribute to the safer operation of London's Roads by supporting enhancements to signalling, traffic management, customer information and enforcement of safe vehicle behaviour. Key contributing projects include DEC, SITS, E-Scooters, Surface Transport Video Solution (STVS), Remote Monitoring	Safe: London's streets will be safe and secure
Improved bus and Assisted Transport services	Contributing to improving the efficient management of bus and Assisted Transport services and the customer experience by renewing and enhancing the IT systems supporting bus and Dial-a-Ride operations and customer information. Key contributing projects include iBus2, Dial-a-Ride and Countdown 3	Quality Public Transport
Improved compliance	Improving compliance with speed limits and regulated vehicle standards by enhanced and flexible enforcement and systems to support compliance on the part of taxis and private hire vehicles. Key contributing projects include DEC, ECOS, CPOS Data Futures	Safe: London's streets will be safe and secure
More active travel	Support mode shift to sustainable modes by delivering tools to support real-time management of the road network for people walking and cycling, and improving the Cycle Hire scheme (for example, e-bikes, app hires). Key contributing projects include SITS, Cycle Hire	Healthy Streets and Healthy People, Efficient use of road space
Value for money	Ensuring that our services continue and the programme benefits are realised as efficiently as possible and deliver best value, saving money and generating / protecting revenue wherever possible. Key contributing projects include Countdown 3, STVS, Cycle Hire, DEC	Prudent

8 Crime and Disorder Implications

- 8.1 The Programme will be delivered in accordance with the Crime and Disorder Act 1998. TfL has recently reviewed the risks we face from cyber threats across our technology systems, data, information and digital estate, and adopted a cyber security strategy and improvement programme. The Programme has commenced scoping risks and options to address vulnerabilities of operating technologies that support critical systems covered under the Network and Information Systems

Regulations 2018, as well as starting to expand our risk assessment to our wider technology estate.

9 Equalities Implications

9.1 TfL has an obligation under the Equality Act 2010 to:

- (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act 2010;
- (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and
- (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.

9.2 The Programme will be delivered in accordance with the Equality Act 2010 and all aspects of the Public Sector Equality Duty. Consideration is given to the need for an Equality Impact Assessment for each project. For the Surface Technology Programme, particular areas of focus include protection of data, customer information, ensuring our systems are user friendly and are kept in a good state of repair, and improving safety and security for all our customers.

10 Assurance

10.1 TfL Project Assurance conducted an Integrated Assurance Review on the proposed Surface Technology Programme in June 2022.

10.2 First-line assurance continues to be carried out on the Programme and its constituent projects. The next Programme level assurance review will be carried out in advance of the annual submission to the Committee in March 2023.

List of appendices to this report:

Appendix 1: Surface Technology Programme 2022/23 – 2023/24 Overview

List of Background Papers:

Independent Assurance Review

Surface Technology Programme 2022/23 – 2023/24 paper (in Part 2 of the agenda)

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Appendix 1: Surface Technology Programme 2022/23 – 2023/24 Performance Overview

Focus area: Roads Technology, key activities

Project / Programme	Scope & Key Activities
Surface Intelligent Transport Systems (SITS) Programme	Delivering innovative traffic management systems to make walking, cycling and bus journeys, plus essential emergency services and freight trips, more efficient. SITS delivers these outcomes through four strands: Real Time Optimiser (RTO) to manage the traffic signals, COV-IMS to improve incident detection and response times; both in delivery. Data and Analytics will improve our view of people walking, cycling and travelling by bus, and Predictive will model an optimal response in real time.
Tunnels Incident Management Re-Let	Re-Let of the safety-critical HORUS system used to manage TfL’s 13 road tunnels, including Blackwall and Rotherhithe, prior to existing system contract expiry. Will also incorporate Silvertown Tunnel.
SAFE Re-Let	Re-Let of the SAFE system used to manage incidents in Network Management Control Centre. Project will mobilise in summer 2022.
Remote Monitoring of Traffic Lights	881 of our traffic signals are monitored through a telephone network, which will be obsolete in Winter 2025. We need to migrate onto a new monitoring network to meet legal requirements and ensure the safety of our customers, prior to the current one being switched off. We will complete feasibility and confirm the solution by September 2022.

Project / Programme	Lifecycle stage	Original completion date	Current completion date	Original BCR / NFE	Current BCR / NFE	Commitments for 2023/24 onwards and Comments
SITS RTO	Stage 5	2021	Summer 2023	SITS Programme 3.3:1	SITS Programme 4.8:1	Commitment of £12.3m in future years supplier cost for contract signed in 2017. Prolongation due to additional time for supplier to deliver. Programme BCR improved following review of response times to incidents, updated to show impact on first <i>active</i> response (e.g. adjusting traffic signal timings), rather than any first response (e.g. viewing incident on CCTV).
SITS COV-IMS	Stage 5	Spring 2022	Spring 2023			Prolongation due to additional time for supplier to deliver. No further commitments.
SITS Data & Analytics	Stage 2	May 2025	Autumn 2025			£4.4m for anticipated delivery commitments. Prolongation due to increased time to review.
SITS Predictive	Stage 2	2026	2026			£5.9m for anticipated delivery commitments.
Tunnels Incident Management Re-Let	Stage 0	Summer 2026	Summer 2026	Business case in development		£7.7m for anticipated delivery commitments.
Incident Management Re-procurement	Stage 0	Summer 2026	Summer 2026	Business case in development		£2.9m for anticipated delivery commitments.
Remote Monitoring of Traffic Lights	Stage 2	Spring 2026	Spring 2026	Business case in development		Commitment of £4m in future years for anticipated delivery commitments.

Focus area: Compliance, Enforcement and Safety Technology, key activities

Project / Programme	Scope & Key Activities
Enforcement & Compliance Operations System (ECOS)	Procurement of core IT systems to replace and improve existing CPOS digital capability. Development commenced August 2021 using internal team and working with dependent projects to ensure that needs are met. Delivery of new capabilities will commence mid 22/23 onwards, with incremental software releases until 23/24.
Deployable Enforcement Cameras	Improve road safety and reduce congestion by targeted camera enforcement. Phase 1 – Contract for delivery signed July 2021. Fifty cameras operational by 24 May 2022. Phase 2 - Project has been initiated and being stood up for expansion with up to 100 additional cameras to be deployed per year afterwards.
Surface Technology Video Solution	Our ability to view and manage surveillance cameras is crucial to ensure the safe operation of our network and services. This project implements a new video management system (VMS), allowing us to continue to view, control and record using surveillance cameras. The current contract that provides the VMS is expiring, so the project will go to market following a competitive procurement process.
Surface Workforce Management (SWFM)	Procurement and implementation of a new solution to replace existing Surface Workforce planning tools that are due to expire in May 2023. Working with LU workforce Planning project and reporting to ERP Programme to ensure synergy and pan TfL benefits, opportunities and saving between the projects. Options development and procurement within 22/23 with design and implementation to commence directly after and finishing in 23/24.

Project / Programme	Lifecycle stage	Original completion date	Latest completion date	Original BCR / NFE	Latest BCR / NFE	Commitments for 2023/24 onwards and Comments
ECOS	Stage 3	Summer 2023	Summer 2023	N/a: compliance case		£1.8m commitment for future years, covering supplier license costs required for delivery.
DEC Phase 1	Stage 5	31 March 2022	May 2022	£19.1m	£19.1m	Prolongation for Phase 1 due to additional time required to complete systems integration.
DEC Phase 2	Stage 1	July 2023	July 2023	Business case in development		£12.8m commitment in future years, for anticipated delivery commitments in longer-term supplier agreement.
Surface Technology Video Solution	Stage 1	May 2025	May 2025	Business case in development		£6.6m commitment in future years, for anticipated delivery commitments.
Surface Workforce Management (SWFM)	Stage 2	Spring 2025	Spring 2025	Business case in development		£5.6m commitment in future years, for anticipated delivery commitments.

Focus area: Public Transport Technology, key activities

Project / Programme	Scope & Key Activities
iBus2	iBus is the Automatic Vehicle Location system for the London bus network, which is crucial to operating these services and is approaching end-of-life. Procurement for iBus2 is progressing well, with Competitive Dialogue commencing shortly and contract award scheduled for Autumn 2023.
Countdown 3	Countdown signs provide real time arrival information at over 2,700 bus stops and stations. The Countdown 3 project will re-procure contracts to support and maintain these signs and give TfL a mechanism to purchase new signs in future. Procurement to start in Autumn 2022.
Cycle Hire Modernise and Electrify	Major modernisation of the back-office operating system for Santander Cycles; introducing 500 e-bikes, a new tariff and App enhancements. The 500 e-bikes and the new tariff are planned for launch in summer 2022, with further customer and back-office functionality to follow throughout 2022/23.
Cycle Hire Re-Let	The procurement of new operating contracts and a major refresh of obsolete, poor performing assets at the end of the current operating contracts, expiring from 2025. Funding for 2022/23 includes optioneering, business case development and procurement planning activities.
Bus Ops – Network Upgrade	This project aims to improve current network performance and resilience at 36 bus stations and Victoria Coach Station to enable staff to perform their role effectively. Key activities for 22/23 is completion of site surveys at all bus and coach stations within scope, delivery of improvements at 5 stations (pilot scheme). Delivery of improvements at other stations within scope expected to take place in FY 23/24.

Project / Programme	Lifecycle stage	Original completion date	Latest completion date	Original BCR / NFE	Latest BCR / NFE	Commitments for 2023/24 onwards and Comments
iBus2	Stage 2	2025	Spring 2027	NFE: £75m	NFE: £75m	£0.08m commitment in 23/24 for costs associated with prolongation, due to increased time to confirm requirements and undertake procurement to the required quality; corresponding EFC increase has impacted BCR.
Countdown 3	Stage 2	Autumn 2024	Spring 2025	NFE: £199m	NFE: £199m	Prolongation due to increased time to confirm data transfer requirements. No additional commitments anticipated.
Cycle Hire Modernise and Electrify	Stage 4	Autumn 2022	Spring 2023	Included in the paper in Part 2 of the agenda		Prolongation due to additional time to design and develop an integrated solution across multiple suppliers and systems. No additional commitments anticipated.
Cycle Hire Re-Let	Stage 1	Summer 2025	Summer 2025	Business case in development		No additional commitments anticipated.
Bus Ops – Network Upgrade	Stage 2	Spring 2025	Spring 2025	Business case in development		£5m commitment in future years for equipment purchase and roll-out.

Programmes and Investment Committee

Date: 20 July 2022



Title: Road User Charging

This paper will be considered in public

1 Summary

- 1.1 This paper summarises the key developments in Road User Charging (RUC) since the last update was given to the Committee at its meeting in March 2022, as part of the wider Air Quality and Environment (AQE) Programme annual submission. Specifically, progress of the three newest proposed RUC projects (London-wide Ultra Low Emission Zone (ULEZ), Scrappage Scheme and Future RUC) is outlined along with an assessment of the likely requirement for additional Programme and Project Authority to the end of 2022/23, totalling £53.7m, which would be requested once TfL's funding position is clearer.
- 1.2 A paper containing exempt information is included on Part 2 of the agenda. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972, in that it contains information relating to the business affairs of Transport for London (TfL). Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and the exempt supplementary paper on Part 2 of the agenda.**

3 Background

- 3.1 In March 2022, the Committee approved additional Programme and Project Authority of £54.5m for the wider AQE Programme, increasing the total Programme and Project Authority from 2017/18 to £518.4m. Of the £54.5m approved, £49.7m was specifically for RUC in 2022/23, split as:
- (a) £20.5m to commence initiation, development work and any necessary early purchasing for the proposed London-wide ULEZ project, up to P8 2022/23;
 - (b) £26.5m to continue development of the RUC in-house BOps System workstream;
 - (c) £2.3m to progress RUC re-let procurement activities for 2026;
 - (d) an initial allocation of £0.5m to commence early scoping and feasibility work for the Future RUC project, with the project returning later in 2022/23 to request further authority for the remainder of the financial year; and
 - (e) no authority was sought for the TUC project as forecast spend for 2022/23 is within the previously approved £6.8m Programme and Project Authority, transferred from the Silvertown project in October 2021.

- 3.2 Due to the very early stage of development of the Scrappage and Future RUC projects, detailed cost forecasts were not available to be included in the last submission to the Committee. As these schemes and the proposed London-wide ULEZ project are categorised as enhancements, they were not included as part of the TfL Budget in March 2022 and are therefore currently unbudgeted, as further outlined in Section 6.4. Forecasts for these projects have continued to be refined and, while estimates are included in this paper and the exempt supplementary paper, refinement continues and it is proposed that Authorities will be sought from the Committee when TfL's funding position is clearer.
- 3.3 RUC was undergoing a critical period of growth at the time of the last submission to the Committee in March 2022. The Mayor's request for TfL to progress two potential RUC projects in January and March 2022 aims to take further bold action to tackle London's toxic air pollution, the climate emergency and traffic congestion. The resulting change in significant components of RUC means that additional authority is now required this financial year for these latest RUC proposals to prepare for their potential delivery at pace, subject to the Mayor deciding to implement the proposals following consideration of the consultation responses, impact assessment and other relevant considerations.
- 3.4 The key projects within RUC now include:
- (a) the potential London-wide ULEZ in 2023;
 - (b) Blackwall and Silvertown TUC in 2024;
 - (c) the BOps system (in-house);
 - (d) the potential Future RUC; and
 - (e) the re-let of service contracts in 2026.

4 RUC Progress Update

- 4.1 **Proposed London-wide ULEZ:** Following submission to the Committee in March 2022, work has continued on the proposed London-wide ULEZ scheme. The Mayor announced in March 2022 that TfL was to consult on the proposal to expand the ULEZ London-wide in 2023 and this began on 20 May 2022 for a period of ten weeks. The proposed expansion of the ULEZ London-wide would have a significant effect on emissions relative to the cost to Londoners as a whole, as well as helping to tackle the climate emergency and traffic congestion. Around 4,000 premature deaths in 2019 were attributed to filthy air, with the greatest number in outer London. The current and long-term threat from toxic air pollution to public health is significant. All Londoners live in areas that breach the World Health Organization (WHO) target for particulate matter and nitrogen dioxide, around 500,000 suffer from asthma and a similar number will develop diseases linked to dirty air over the next 30 years. In the same period, it is estimated harmful emissions will cost the NHS and social care £10.4bn if no further action is taken to improve air quality.
- 4.2 TfL is working quickly to clean up its services with more than 800 zero emission at tailpipe buses, making it the largest green fleet in western Europe. Strict licensing standards mean that over a third of black cabs are now zero emission capable. As part of the wider move to electric, all drivers are being supported to switch to the cleanest vehicles, with more than 10,000 charging points now within the M25 – a third of the UK's total. Despite these interventions, toxic emissions from road transport in outer London are not reducing at the same speed as in central and

inner London and further action is needed. If the proposed London-wide ULEZ expansion were to be implemented, it is estimated that the number of cars not meeting the ULEZ standards each day in outer London would fall from 160,000 to 46,000 and the number of vans from 42,000 to 26,000. These proposals would mean the air around an additional 145 schools, mostly in outer London, would meet the interim WHO target for nitrogen dioxide. The changes would also see a further 340,000 Londoners living in areas meeting these international health-based standards.

- 4.3 The previous submission to the Committee, in March 2022, assumed delivery of the potential scheme by May 2024 at the latest, subject to consultation. However, reflecting the urgency of action required to address the triple challenges of air quality, climate change and congestion, more ambitious timescales have been explored. Subject to the public consultation and decision by the Mayor, the London-wide ULEZ expansion is now proposed to launch on 29 August 2023.
- 4.4 The cost estimate and forecast for the expansion have continued to be refined since the last submission. The Estimated Final Cost in March 2022 was based on the long list of options outlined by the Mayor in his announcement in January 2022 and has now reduced following clarification of the proposal including the launch date, as outlined in the submission on Part 2 of the agenda.
- 4.5 If the proposal does progress, a third party-funded vehicle scrappage scheme is likely to be launched, which could go live before the London-wide ULEZ. It is expected that eligible applicants will be offered an incentive to scrap their non-compliant vehicle, either in the form of a grant payment or alternatives such as mobility credits or vouchers to incentivise more sustainable transport options.
- 4.6 **Tunnel User Charging:** The Blackwall and Silvertown TUC system must be in place for December 2024 as required in the Development Consent Order granted by the Secretary of State for Transport in May 2018.
- 4.7 Delivery options have been assessed for the TUC considering the expanded projects within RUC, ensuring resources are appropriately focused on the longer-term deliverables. Details of this assessment and the resulting delivery recommendation are outlined in the submission on Part 2 of the agenda.
- 4.8 **Business Operations System (in-house):** Endorsement was given by the Committee following its meeting on 2 March for delivering the BOps system in-house from 2026. Timescales for BOps were originally aligned to deliver alongside TUC in 2024, although this was time sensitive and dependant on securing necessary approvals to enable a ramp-up in resources. The length of the approval process now means that the delivery of BOps in-house is no longer viable for 2024 and this option was therefore removed from the TUC options assessment referred to above. Timescales are under review to target the significant, longer term deliverables on potential Future RUC, closely coordinated with the RUC re-let project. Latest estimates for the Procurement Authority that is likely to be required are included in the exempt supplementary information.
- 4.9 **Future RUC:** The Mayor's announcements in early 2022 referred to a new 'smart road user charging' scheme and this is being explored as the Future RUC project. This could potentially replace existing charges, such as the Congestion Charge, LEZ and ULEZ with a single RUC scheme that uses more sophisticated technology to make it as simple and fair as possible for Londoners. The potential scheme is in the early stages of initiation and high-level policy questions are included in the public consultation taking place between May and July 2022, as

part of the proposed London-wide ULEZ project. The potential scheme is being developed in close coordination with BOps in-house and Re-Let projects, as there are critical dependencies between the three schemes.

- 4.10 **RUC Re-Let:** The operating model for RUC comprises three service contracts that will expire in 2026:
- (a) Detection and Enforcement Infrastructure (D&EI);
 - (b) Business Operations System and Services; and
 - (c) Enforcement Operations System and Services (EOps).
- 4.11 Activities for the re-let of these service contracts are continuing ahead of their expiry in September 2026, with the BOps system now endorsed for delivery in-house. The project is closely aligned with the Future RUC and BOps in-house projects to accurately inform requirements for the Re-Let procurement activities and coordinate timescales to ensure a seamless transition in services.

5 RUC Delivery in 2022/23 for this submission

- 5.1 **Proposed London-wide ULEZ:** Following the initial authority submission to the Committee in March 2022, additional Programme and Project Authority will be sought from the Committee when TfL's funding position is clearer, to progress the potential scheme to the end of 2022/23, at which point the scheme will have more certainty on progression, or not, and an update will also be given to the Committee as part of the wider AQE annual programme submission in March 2023. Funding to date has been focused on successfully progressing the scheme to public consultation, including completion of the Integrated Impact Assessment and production of consultation materials, along with the provisional placement of orders for long-lead time items to maintain the viability of a potential August 2023 launch date.
- 5.2 Further assessment has taken place to identify and manage delivery risks for the accelerated timescales, should the Mayor decide to proceed with the expansion of ULEZ, in particular the need to install cameras and signage on borough roads to ensure high compliance. The current camera network in outer London is limited to the Transport for London Road Network to enforce the Low Emission Zone and failure to strengthen this network will likely lead to lower compliance as some drivers seek alternative routes to avoid detection by enforcement cameras. Our preference is to have a standardised written agreement detailing the general approach to implementing the scheme in the form of a letter agreed under Section 8 of the Highways Act 1980. This approach should simplify the process for all parties and enable the required timescales to be met. TfL and the Mayor will only use their statutory powers under Schedule 23 GLA Act to directly install signage and cameras in the absence of Section 8 Agreements and/ or Streetworks permits if the required timescales are not met. Following local elections in May, we are working with boroughs to discuss this approach and the timelines involved.
- 5.3 Following completion of the public consultation in July 2022, and analysis of the responses received, the Mayor will be asked to consider the consultation report, the Integrated Impact Assessment and any other relevant information and decide whether the revised ULEZ scheme should go ahead. Expenditure is being minimised as much as practicable until after the Mayor's decision, however orders for some remaining long-lead items may be placed before December 2022, to

meet the planned launch date on 29 August 2023. Should the Mayor decide not to progress with the scheme, options for buy-back of materials will be discussed with suppliers, along with alternative use on other projects.

- 5.4 Should the scheme proceed following the Mayor's decision, it will be critical to undertake a substantial marketing campaign to raise awareness of the scheme implementation as far in advance as possible. Compliance is high, and growing, in the proposed expanded zone and advertising is planned to commence in January 2023, after the Mayoral decision, to support this. Commitments for 2023/24 will also need to be made in late 2022/23 due to media booking deadlines and so Programme and Project Authority will need to be sought when TfL's funding position is clearer for 2023/24 to enable these activities to be commissioned. Should the scheme not go ahead, the campaign would be cancelled at the earliest opportunity to minimise potential abortive costs.
- 5.5 **Scrappage Scheme:** City Hall colleagues are leading discussions with Government to secure funding for a scrappage scheme to support the proposed London-wide ULEZ, as they have done for other UK cities introducing similar scrappage schemes. Discussions seek to secure a substantial funding source, enabling the scale of uptake needed to incentivise people to scrap their non-compliant vehicle. Therefore, to maintain viability of delivery, we plan to undertake early activities to build a more automated scrappage solution for launch ahead of the potential London-wide ULEZ scheme introduction on 29 August 2023.
- 5.6 **Future RUC:** Following the initial Programme and Project Authority allocation approved by the Committee in March 2022, additional authority will be required to the end of 2022/23 and will be sought when TfL's funding position is clearer. This will fund key activities including requirements setting, option assessment, modelling to develop proposals and early systems development. It will also fund analysis of responses to the current public consultation relating to high-level policy questions, helping to inform the development of the potential scheme. These activities would help progress the project to a potential scheme specific public consultation in future years. The project will seek additional Programme and Project Authority from the Committee in March 2023 as part of the planned AQE programme annual submission.
- 5.7 The relationship between the Future RUC, BOps in-house and re-let projects is complex, with multiple dependencies and inter-linked requirements. These are being closely managed by the project teams to ensure key activities, timescales and resources are coordinated to support efficient delivery.

6 Challenges and Opportunities

- 6.1 There is an opportunity for RUC to play an important role in addressing the triple challenges of toxic air pollution, the climate emergency and congestion. This is reflected in the ambitious delivery dates for schemes, most notably the proposed London-wide ULEZ in August 2023, subject to consultation, and the development of the Future Road User Charging project.
- 6.2 As noted in the last submission to the Committee, resources remain a critical challenge for the successful delivery of several RUC projects, particularly for BOps in-house. Although resources have been secured for the wider project teams since March, specialist technical resource remains a key risk due to the scale of resource needed combined with the limited market availability.

- 6.3 The complex inter-dependencies between RUC schemes have increased since the introduction of additional projects in early 2022. Most notably the full impact Future RUC will have on the BOps in-house and Re-Let projects is still being assessed. While BOps in-house and the Re-Let have more certainty, Future RUC is significant and uncertain; therefore, we will work to assumptions but must prepare for all eventualities. Project teams are working closely together to identify and manage overlaps, particularly for requirements and timescales, with opportunities for efficiencies being explored along with minimising of delivery risks.
- 6.4 Improved financial certainty is critical. Not all the RUC schemes in this paper were included in the Managed Decline scenario which informed the TfL Budget. Proposed London-wide ULEZ, Scrappage and Future RUC are currently unbudgeted. This matter will be addressed when Authorities are sought.

7 Legal Implications

- 7.1 It will be ensured that any specific activity for which authority is given falls within the scope of TfL's powers to undertake preparatory work in respect of a RUC scheme and that it is reasonable and necessary to incur these costs.
- 7.2 **Privacy and the UK General Data Protection Regulation (GDPR):** TfL is under a legal duty to protect personal data and to ensure compliance with the UK GDPR and associated data protection legislation, including the Data Protection Act 2018. A range of robust policies, processes and technical measures are in place to control and safeguard access to, the use of, personal information associated with all RUC schemes.

8 Financial Implications

- 8.1 Financial Authority is currently provided through the two-year Budget for 2022/23 and 2023/24, approved by the Board in March 2022.
- 8.2 The sums for which Programme and Project Authority is likely to be sought (and which are being refined further) are set out below.

Activity Areas	Current Financial Authority to 22/23 £m	Current P&PA Authority £m	Additional Proposed P&PA Authority £m	Anticipated Likely Authority Request (£m)							
				2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2017/18 to 2024/25
Road User Charging	310	346	53.7	29	32	48	104	62	124	0	399.7

Table 2: RUC Anticipated Likely Authority Request

9 Assurance

- 9.1 An Integrated Assurance Review (IAR) on the proposed London-wide ULEZ project was carried out in May and June 2022 by the TfL Assurance Team and the Independent Investment Programme Advisory Group. One critical issue was identified due to the continued uncertainty of full funding for the proposed London-wide ULEZ project. Other recommendations focus on ensuring that, despite the pressing time scales for implementation, the business case and supporting project documentation is robust for the design of the proposed expansion. All these recommendations were accepted by the project team.
- 9.2 The Integrated Assurance Plan was updated in July 2022 and sets out the proposed reviews for projects within the wider AQE Programme for the next 12 months.

List of appendices to this report:

Exempt Supplementary Paper (Part 2)

List of Background Papers:

Programme and Investment Committee 2 March 2022

Contact Officer: David Rowe, Interim Director of Investment Delivery Planning
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Programmes and Investment Committee



Date: 20 July 2022

Item: Members' Suggestions for Future Discussion Items

This paper will be considered in public

1 Summary

- 1.1 This paper presents the current forward plan for the Committee and explains how this is put together. Members are invited to suggest additional future discussion items for the forward plan. Members are also invited to suggest items for future informal briefings.

2 Recommendations

- 2.1 **The Committee is asked to note the forward plan and is invited to raise any suggestions for future discussion items for the forward plan and for informal briefings.**

3 Forward Plan Development

- 3.1 The Board and its Committees and Panels have forward plans. The content of the plan arises from a number of sources:
- (a) Standing items for each meeting: Minutes; Matters Arising and Actions List; and any regular quarterly or periodic reports. For this Committee, this is the quarterly Investment Programme Report.
 - (b) Programmes and Projects at a level requiring Committee approval. These include the annual review of the sub-programmes in the Investment Programme and other approvals sought following advice from the operating businesses.
 - (c) Items requested by Members: The Deputy Chair of TfL and the Chair of this Committee will regularly review the forward plan and may suggest items. Other items will arise out of actions from previous meetings (including meetings of the Board or other Committees and Panels) and any issues suggested under this agenda item.

4 Current Plan

- 4.1 The current plan is attached as Appendix 1. Like all plans, it is a snapshot in time and items may be added, removed or deferred to a later date.

List of appendices to this report:

Appendix 1: Programmes and Investment Committee Forward Plan 2022/23

List of Background Papers:

None

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Programmes and Investment Committee Forward Plan 2022/23

Membership: Ben Story (Chair), Dr Nelson Ogunshakin OBE (Vice Chair), Seb Dance, Julian Bell, Dr Lynn Sloman MBE and Peter Strachan.

Government Special Representative: Becky Wood

Abbreviations: CCO (Chief Capital Officer), CCSO (Chief Customer and Strategy Officer), CFO (Chief Finance Officer), COO (Chief Operating Officer), D IDP (Director Investment Delivery Planning)

Standing Items		
Use of Delegated Authority	General Counsel	Standing item
Quarterly Investment Programme Report	CCO, CCSO and COO	To note high-level progress updates of the Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
Independent Investment Programme Advisory Group Quarterly Report	General Counsel	Standing item
TfL Project Assurance	General Counsel	Standing item
Regular programme annual reviews		

19 October 2022		
Piccadilly Line Upgrade	D IDP	Update and approval
London Underground Enhancements	D IDP	Update and approval
Docklands Light Railway Rolling Stock	D IDP	Update and approval

Items to be scheduled:

- London Overground future planning
- Rotherhithe Tunnel
- Fiveways Corner in Croydon
- Lessons Learnt from Complex Projects with Commercial Issues (CCO)
- Enterprise Risk Update - Delivery of key projects and programmes (ER8) (CCO)
- London Underground Technology Programme (D IDP) – March 2023

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