

Agenda

Meeting: Programmes and Investment Committee

Date: Thursday 5 March 2020

Time: 10.15am

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

Members

Prof Greg Clark CBE (Chair)

Dr Nelson Ogunshakin OBE (Vice-Chair)

Heidi Alexander

Ron Kalifa OBE

Dr Alice Maynard CBE

Mark Phillips

Dr Nina Skorupska CBE

Dr Lynn Sloman

Ben Story

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

This meeting will be open to the public, 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: Jamie Mordue, Senior Committee Officer; Tel: 020 7983 5537; email: JamieMordue@tfl.gov.uk.

For media enquiries please contact the TfL Press Office; telephone: 0845 604 4141; email: PressOffice@tfl.gov.uk

Howard Carter, General Counsel
Wednesday 26 February 2020

**Agenda
Programmes and Investment Committee
Thursday 5 March 2020**

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 December 2019
(Pages 1 - 10)**

General Counsel

The Committee is asked to approve the minutes of the meeting of the Committee held on 18 December 2019 and authorise the Chair to sign them.

4 Matters Arising and Actions List (Pages 11 - 16)

General Counsel

The Committee is asked to note the updated actions list.

5 Elizabeth Line Operational Readiness and Crossrail Update - to follow

6 Crossrail Central Operating Section Traction Power (Pages 17 - 26)

Chief Operating Officer – Elizabeth line

The Committee is asked to note the paper and approve authority.

7 Investment Programme Report - Quarter 3 2019/20 (Pages 27 - 74)

Director Major Projects, Managing Director London Underground and TfL Engineering and Managing Director Surface Transport

The Committee is asked to note the paper.

8 Independent Investment Programme Advisory Group Quarterly Report (Pages 75 - 92)

General Counsel

The Committee is asked to note the Independent Investment Programme Advisory Group's Quarterly Report, Management Responses and the exempt supplemental information on Part 2 of the agenda.

9 Project Assurance Update (Pages 93 - 96)

General Counsel

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

10 Use of Delegated Authority (Pages 97 - 102)

General Counsel

The Committee is asked to note the paper.

11 Crossrail 2 (Pages 103 - 108)

Managing Director Crossrail 2

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

12 London Underground Renewals and Enhancements Fleet Programme (Pages 109 - 120)

Managing Director London Underground and TfL Engineering

The Committee is asked to note the paper and approve authority.

13 London Underground Signals and Control Programme (Pages 121 - 130)

Managing Director London Underground and TfL Engineering

The Committee is asked to note the paper and approve authorities.

14 Piccadilly Line Upgrade - Stage 1 (Pages 131 - 138)

Director Major Projects

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

15 Surface Transport Asset Renewals Programme (Pages 139 - 168)

Managing Director Surface Transport

The Committee is asked to note the paper and approve authorities.

16 Public Transport Programme, 2020/21-2022/23 (Pages 169 - 184)

Managing Director Surface Transport

The Committee is asked to note the paper and approve authority.

17 Technology and Data Programme 2020/21 and 2021/22 (Pages 185 - 202)

Director of Strategy and Chief Technology Officer

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

18 Member suggestions for future agenda discussions (Pages 203 - 208)

General Counsel

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

19 Any Other Business the Chair Considers Urgent

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

20 Date of Next Meeting

Wednesday 20 May 2020 at 10.15am.

21 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.

22 Elizabeth Line Operational Readiness and Crossrail Update - to follow

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

23 Independent Investment Programme Advisory Group - Quarterly Report (Pages 209 - 216)

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

24 Project Assurance Update (Pages 217 - 220)

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

25 Crossrail 2 (Pages 221 - 226)

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

26 Piccadilly line Upgrade - Stage 1 (Pages 227 - 236)

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

27 Technology and Data Programme 2020/21 and 2021/22 (Pages 237 - 240)

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

Transport for London

Minutes of the Programmes and Investment Committee

Committee Rooms 1 & 2, Palestra,
197 Blackfriars Road, London, SE1 8NJ
11.00am, Wednesday 18 December 2019

Members Present

Professor Greg Clark CBE (Chair)
Heidi Alexander (from minute 83/12/19)
Ron Kalifa OBE
Dr Alice Maynard CBE
Mark Phillips
Dr Lynn Sloman
Ben Story (up to and including minute 76/12/19)

In Attendance

Executive Committee

Mike Brown MVO	Commissioner
Howard Carter	General Counsel
Stuart Harvey	Director of Major Projects
Simon Kilonback	Chief Finance Officer
Andy Lord	Managing Director, London Underground and TfL Engineering
Shashi Verma	Director of Strategy & Chief Technology Officer (for minute 84/12/19)

Other Staff

Alexandra Batey	Head of Air Quality, Environment and Technology, Investment Delivery and Planning (for minute 83/12/19)
Tanya Coff	Divisional Finance Director, London Underground
Patrick Doig	Divisional Finance Director, Surface Transport
Christian Fowler	Head of Line Upgrades Sponsorship, Investment Delivery Planning (for minute 86/12/19)
Lorraine Humphrey	Head of TfL Project Assurance
Rob Niven	Head of London Underground Major Projects Sponsorship (for minute 87/12/19)
David Rowe	Head of Major Projects Sponsorship, Investment Delivery Planning (for minute 85/12/19)
Howard Smith	Chief Operating Officer - Elizabeth line (for minutes 77/12/19 and 78/12/19)
Jamie Mordue	Senior Committee Officer

Crossrail Limited

Mark Wild	CEO, Crossrail Limited (for minutes 77/12/19 and 78/12/19)
Chris Sexton	Deputy CEO, Crossrail Limited (for minutes 77/12/19 and 78/12/19)

Independent Investment Programme Advisory Group (IIPAG) Attendance

Alison Munro	Chair, IIPAG
Kenny Laird	IIPAG

73/12/19 Apologies for Absence and Chair's Announcements

Apologies for absence were received from Dr Nelson Ogunshakin OBE and Dr Nina Skorupska CBE. Gareth Powell was also unable to attend the meeting.

To reflect TfL's focus on safety, the Chair invited Members to raise any safety issues in relation to items on the agenda or within the remit of the Committee at the start of the item or under Matters Arising. Any other safety issues than these could be discussed with the General Counsel or an appropriate member of the Executive Committee after the meeting.

74/12/19 Declarations of Interests

Members confirmed that their declarations of interests, as published on tfl.gov.uk, were up to date.

75/12/19 Minutes of the Meeting of the Committee held on 23 October 2019

The minutes of the meeting held on 23 October 2019 were approved as a correct record and signed by the Chair.

76/12/19 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.

77/12/19 Crossrail Update

This item and the item on the Strategic Risk were taken together at the meeting but have been minuted separately.

Howard Smith introduced the paper and the supplemental information on Part 2 of the agenda. The paper provided an update on the status of the Crossrail project, an update on the periodic reports from the Project Representative on Crossrail and an overview of the Project Delivery Partner (PDP) Services Contract.

The Committee noted at its meeting on 17 July 2019 that the discussions on the PDP contract with Bechtel Limited were not complete. As there were changes to the arrangements finally agreed upon, it was appropriate to seek a revised approval from the Committee.

Mark Wild told the Committee that safety remained a high priority and the headline numbers on injuries was broadly similar to other high performing programmes, such as the 2012 Olympic and Paralympic Games, but the number of high potential near

misses would need to be closely monitored. There would also be a focus on ensuring that the move from engineering to operations did not affect Crossrail Limited's (CRL) efforts to pursue zero injuries, which would require clarity from all parties involved in the handover.

The Committee asked that TfL readiness for the Elizabeth line be included on the agenda for a future meeting. **[Action: Andy Lord]**

The year had ended strongly and work on the tunnels was scheduled to be completed in early 2020. Pudding Mill Lane had been reenergised, which had meant the whole of the project was electrified. Paddington was scheduled to be personal protective equipment free at the end of January 2020.

The early part of the opening window was now not viable as the latest version of software would require further tweaks to ensure trial running could be undertaken safely.

TfL had shared engineering resource with CRL, which had increased the productivity of the project.

The Committee noted the paper and exempt supplementary information on Part 2 of the agenda and approved the changes proposed by Crossrail Limited to the current Financial Incentive Scheme.

78/12/19 Strategic Risk Update – Opening of the Elizabeth line (SR16)

Howard Smith introduced the paper, which provided an update on TfL's governance arrangements for the management of the pan-TfL Strategic Risk relating to the opening of the Elizabeth line.

The risk to the timely opening of the Elizabeth line (SR16) had been assessed against four impact categories: Health, Safety and Environment; Customers and Stakeholders; Finances; and Stakeholder Confidence. Scoring each impact category helped to determine whether the risk was within acceptable corporate tolerance levels.

Challenges had been identified in the handover process and in maintaining production across the programme, as the work to complete the following was done in parallel: finishing construction activities, completing testing and assurance requirements, and preparing for handover to the Infrastructure Managers.

The controls currently in place and the additional activities were considered adequate for the management and oversight of the risk of further delays to the opening of Elizabeth line services. Although challenges remained on the programme, the increased transparency and enhanced engagement between organisations would help TfL to plan and mitigate the effects of these events.

The Committee noted the paper.

79/12/19 Investment Programme Report – Quarter 2 2019/20

The Chair invited Members to ask questions on the report, which set out the progress and performance in Quarter 2, 2019/20, on the major projects and sub-programmes.

Members asked why the London Underground stations strategic milestone was red against its RAG (red, amber or green) status. This was in relation to the construction of the new station entrance and concourse at Tottenham Hale station; a new approach had been agreed and was reflected in the latest forecast.

Where the report referred to accessibility, Members requested that greater clarity be provided on what was meant, for example if it specifically referred to those with physical disabilities, neurological disorders or anything else that required accessible travel arrangements. **[Action: Report authors]**

A note would be provided to Members on what protection was used to ensure the data that TfL held was secure, such as data encryption, in addition to security measures like firewalls. **[Action: Shashi Verma]**

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

80/12/19 Independent Investment Programme Advisory Group Quarterly Report

This item and the Project Assurance update were taken together at the meeting but have been minuted separately.

Lorraine Humphrey introduced the paper and the supplementary information on Part 2 of the agenda. The paper provided an update on the work undertaken by the Independent Investment Programme Advisory Group (IIPAG) since the last meeting of the Committee, on 23 October 2019.

There were no new recommendations since IIPAG's last report. Following advice from IIPAG, The terms of reference for Project Assurance Reviews were being revised to clarify the minimum documentation requirements to be made available to support each project review.

There were a number of recurring issues found in the reviews undertaken: capability and resources; programme and portfolio management; cost and risk; schedule pressure; governance; and value for money. These continued to be identified, although resource pressures had eased in some areas.

Work on the effectiveness of the first and second lines of defence project was nearly complete and a report would be presented to the Committee and the Audit and Assurance Committee in 2020. The Fieldwork for the Benchmarking review was nearing completion and the report was in preparation.

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

81/12/19 TfL Project Assurance Update

Lorraine Humphrey introduced the paper and the supplementary information on Part 2 of the agenda. The paper provided an update on the project assurance work undertaken between 15 September 2019 and 29 November 2019.

Although the number of Independent Investment Programme Advisory Group recommendations that were overdue had increased at the time the paper was published, these had since reduced to 30, as in the previous quarter. Most of the oldest recommendations had been closed out.

The number of critical issues agreed with project teams was likely to increase as the level of consistency of reporting had been increased and Project Assurance was working with Finance to ensure proper portfolio management.

Members stated that it was important business plans for programmes were updated to ensure they remained relevant and, where they changed substantially, approval be sought from the Committee.

Members requested a note on the role of Asset Stewards, including responsibilities, accountabilities and objectives. **[Action: Caroline Sheridan]**

The Committee noted the paper.

82/12/19 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 Actions 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 last meeting of the Committee, there had been no decisions taken by Chair's Action and no Mayoral Directions within the Committee's remit. The Commissioner had approved Procurement Authority for one project, relating to Tottenham Hale Station Upgrade Programme Project. The Chief Finance Office had approved Procurement Authority for three projects, relating to Pitta cladding for Crossrail stations, saloon lighting for 92TS for central line improvement programme (incorrectly referred to as Crossrail stations in the cover paper but correct in the appendix) and Finsbury Park Step Free Access and Development works.

The Committee noted the paper.

83/12/19 Air Quality Programme

Alexandra Batey introduced the paper, which provided an update on the Air Quality Programme's progress and planned delivery from December 2019, and requested Programme and Project Authority for the years 2019/20-2023/24.

In 2019, the Programme had achieved a number of key milestones, including the introduction of the central London Ultra Low Emission Zone (ULEZ), 12 Low Emission Bus Zones, 90 upgraded Dial-a-Ride vehicles, 200 Rapid Charge Points and the launch of the HGV Safety Permit application system.

Members congratulated the project team for delivering against key milestones in 2019 and stated that, as air quality and lowering emissions moved higher up the social agenda, it was important that TfL be ambitious and lead the way globally. Whilst it was important to deliver the projects to achieve these aims, it was vital that, should technology advance, TfL did not have stranded assets. A briefing was requested on what was in the pipeline beyond 2021, TfL's further ambitions and the strategy to achieve them. **[Action: Alex Williams/Gareth Powell]**

In terms of hydrogen buses, it was noted that Bamford Bus Company had bought the assets of Wrightbus, rather than the company itself. Bamford and TfL were committed to hydrogen buses but TfL did not have a contract with Bamford. TfL would work to reach agreement where it would make economic sense to draw up a contract for the hydrogen infrastructure and the buses themselves.

New systems to enhance modelling of ULEZ compliance had been developed, which showed that the ULEZ area was now mostly compliant. Around 11 hotspots had been identified, which could now be targeted to improve compliance further.

The Committee noted the paper and approved additional Programme and Project Authority of £100.6m for the period of 2019/20-2023/24 to continue the delivery of the Air Quality Programme.

84/12/19 Emergency Services Network, 4G Pilot and Telecommunications Commercialisation Projects

Shashi Verma introduced the paper and the supplementary information on Part 2 of the agenda. The paper updated the Committee on progress of: the Home Office funded Emergency Services Network (ESN); the Telecommunications Commercialisation Project (TCP); and the Public Cellular Network (PCN) Pilot and related enabling works.

As of November 2019, the extended ESN Phase 1 project had installed 325km of fibre optic cable and 370km of leaky feeder in the in-scope tunnels, which amounted to 421km of tunnels. A second leaky feeder had been installed in the eastern section of the Jubilee line and work would continue extending this into the western section in 2020. The infrastructure for 4G had continued to be trialled and Emergency Services users had been able to make 4G calls and browse the web on a discrete section of the Jubilee line during operational hours.

The 4G infrastructure should be 5G ready but further work would be required to ensure the technology was robust before any decision was made on 5G.

A contract for the delivery and management of the PCN pilot service was signed in June 2019. The detailed design work for the PCN pilot, which covered all stations, platforms and tunnels between Westminster and the portal before Canning Town station, had been completed. TfL was working closely with all four mobile network operators to design and install their equipment and connectivity at Canada Water. Three of the four operators had signed the terms and conditions for the PCN Pilot and discussions continue with the fourth and final operator.

On the TCP, TfL released an Invitation to Participate in Dialogue, in June 2019, to the four shortlisted tenderers. In July TfL reached agreement with the Home Office to align the ESN project with the TCP through dialogue to the next checkpoint in January 2020.

The Committee noted the paper and the supplemental information on Part 2 of the agenda and, subject to Financial Authority being granted following approval of the Business Plan, approved Programme and Project Authority, as set out in the paper on Part 2 of the agenda, for:

- (a) a further extension of the Emergency Services Network Phase 1 infrastructure installation works (subject to full grant funding from the Home Office being agreed for that additional scope through to the end of 2020/21); and**
- (b) an extension of the Public Cellular Network (PCN) enabling works including a second phase of the PCN Pilot to extend its coverage on the Jubilee line.**

85/12/19 Barking Riverside Extension Update

David Rowe introduced the paper and the supplementary information on Part 2 of the agenda. The paper updated the Committee on progress and issues associated with the Barking Riverside Extension (BRE) project.

A 16 day Network Rail blockade was completed in summer 2019, which involved taking over Network Rail mainline infrastructure. The blockade had allowed the construction of a new ramp, piling for a new pier to support the viaduct to the new Barking Riverside station, and signalling and telecommunications work. Three hundred and thirty hours of consecutive work was completed during the blockade.

The Joint Venture's Social Value team was engaging regularly with local businesses, the community and Barking Riverside Limited and TfL's Local Communities and Partnerships team.

Previously unidentified buried utility services, required investigation and the diversion or removal of the conflict. Several of the viaduct piers had issues with the buried services, each required a different solution..

TfL was working with Barking Power Limited to ensure that its plans to migrate and consolidate its sites to the site adjacent to the BRE project did not pose a risk to the BRE Programme.

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

86/12/19 London Underground Power, Cooling and Energy

Andy Lord introduced the paper, which updated the Committee on the Programme's achievements since the last submission and the planned delivery for 2020/21 and 2021/22.

Since July 2018, 11 power projects had been delivered on the power asset renewals work bank, which had improved safety, legislative compliance and reliability. Conceptual design for a further 12 projects had been completed.

With regard to cooling, a new fan had been installed at Bond Street station and feasibility studies for a new fan at Notting Hill Gate station had been concluded.

Croydon Tramlink depot had been selected as the first site to progress with solar panel installation and the Tunnelling and Underground Construction Academy at Ilford and Stratford Market Depot had also been taken forward to feasibility stage.

In 2020/21, the power asset renewals work bank would continue to prioritise the delivery of projects to ensure assets remain safe and compliant. The contract award for Supervisory Control and Data Acquisition systems would be completed. Design work for the replacement of the fan at Shepherd's Bush station would commence.

The Committee noted the paper and approved additional Programme and Project Authority of £1.3m (outturn including risk) to extend the operational life of the Power Supervisory Control and Data Acquisition (SCADA) system, bringing the total Programme and Project Authority to £84.2m.

87/12/19 London Underground Four Lines Modernisation Programme

Stuart Harvey introduced the paper and the supplementary information on Part 2 of the agenda. The paper updated the Committee on progress with delivery of the London Underground Four Lines Modernisation (4LM) Programme.

The Programme was on track to deliver journey time improvements in the central area in May 2021, however delivery and performance challenges meant that there was little spare margin in the Programme to achieve the original target dates. TfL was working with Thales to eliminate some of the initial software problems, including the modification of the trains' communications system and signalling, and to ensure a mutually agreeable schedule could be determined.

IIPAG stated that it was important that the discussion with Thales resulted in a schedule of delivery that was realistic and included any associated costs. Members

stressed the need for third line assurance in ensuring the successful delivery of any revised schedule.

In March 2019, the first section of the new signalling system was successfully implemented on the Circle and Hammersmith & City lines, between Hammersmith and Latimer Road stations. In September 2019, this was extended from Latimer Road to Finchley Road and Euston Square, with trains operating automatically on those sections of the route. Following this successful implementation, there had been a number of lengthy disruptions, which while fewer in number, had been longer in their duration.

Members stated that it was important that communication, particularly with front line staff, was effective, and that customers received accurate and meaningful information. An update on TfL's communication approach would be provided to Members of the Customer Service and Operational Performance Panel.

[Action: Vernon Everitt]

Further Platform Train Interface improvements were planned at Baker Street, where most customer incidents occurred. The feasibility of introducing a longer-term solution to reduce the gap between the train and platform had been accelerated and, under the proposal, a section of the platform would extend and retract to meet the doors of the train. The Committee asked that this take into account level boarding of trains.

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

88/12/19 Member Suggestions for Future Discussion Items

Howard Carter introduced the item and the Committee's updated forward plan.

It was noted that a briefing on accessibility was to be scheduled in 2020, as per the Customer Service and Operational Performance Panel actions list.

The Committee requested an annual update on innovation be added to the Forward Plan.

[Action: Secretariat]

The Committee noted the forward plan.

89/12/19 Any Other Business the Chair Considers Urgent

There was no other urgent business.

90/12/19 Date of Next Meeting

The next scheduled meeting of the Committee would be held on Thursday 5 March 2020 at 10.15am.

91/12/19 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: Crossrail Update; Independent Investment Programme Advisory Group Quarterly Report; TfL Project Assurance Update; Emergency Services Network, 4G Pilot and Telecommunications Commercialisation Projects; Barking Riverside Extension Update; and London Underground Four Lines Modernisation.

The meeting closed at 1.30pm.

Chair: _____

Date: _____

Programmes and Investment Committee



Date: 5 March 2020

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.

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Programmes and Investment Committee Action List (reported to the meeting on 5 March 2020)

Actions from the meeting of the Programmes and Investment Committee held on 18 December 2019

Minute No.	Description	Action By	Target Date	Status note
79/12/19 (1)	<p>Investment Programme Report – Quarter 2, 2019/20: References to accessibility in the report</p> <p>Where the report referred to accessibility, Members requested that greater clarity would be provided on what was meant, for example if it specifically referred to those with physical disabilities, neurological disorders or anything else that that required accessible travel arrangements.</p>	Report Authors	Ongoing	This will be addressed in future reports.
79/12/19 (2)	<p>Investment Programme Report – Quarter 2, 2019/20: Data security</p> <p>A note would be provided to Members on what protection was used to ensure the data that TfL held was secure, such as data encryption, in addition to security measures like firewalls.</p>	Shashi Verma	June 2020	A further update will be provided to Members. See also 31/05/19 below.
81/12/19	<p>TfL Project Assurance Update: Asset Stewards</p> <p>Members requested a note on the role of Asset Stewards, including responsibilities, accountabilities and objectives.</p>	Caroline Sheridan	March 2020	Complete. A note was sent to Members on 13 February 2020.
83/12/19	<p>Air Quality Programme: Plans beyond 2021</p> <p>A briefing was requested on what was in the pipeline beyond 2021, TfL's further ambitions and the strategy to achieve them.</p>	Alex Williams/Gareth Powell	September 2020	An item appears on the Forward Plan for September 2020
87/12/19	<p>London Underground Four Lines Modernisation Programme: Communication with front line staff and customers</p> <p>An update on TfL's communication approach would be provided to Members of the Customer Service and Operational Performance Panel.</p>	Vernon Everitt	July 2020	An update will be provided to CSOPP at its meeting in July 2020

Minute No.	Description	Action By	Target Date	Status note
88/12/19	Member Suggestions for Future Discussion Items: Innovation update The Committee requested an annual update on innovation.	Secretariat	November 2020	Complete. The Board received a briefing on innovation in late 2019. An item appears on the Forward Plan for November 2020.

Actions from previous meetings of the Committee

Minute No.	Description	Action By	Target Date	Status note
60/10/19 (1)	Investment Programme Report – Quarter 1 2019/20: accessibility Members requested a briefing on the work done to improve accessibility and the inclusion strategy, including but not limited to step-free access.	Staynton Brown	March 2020	Complete. On Forward Plan for the Customer Service and Operational Performance Panel. Further papers will be submitted in the second half of 2020.
31/05/19	Air Quality Management Programme: Privacy and Data Security As the Ultra Low Emission Zone Extension was implemented, TfL would necessarily capture more data, as Air Quality Management schemes spread over a wider geographical area. Members requested that a briefing be provided on privacy and data security.	Alex Williams	June 2020	A note on Privacy and Data Security will be provided.

Minute No.	Description	Action By	Target Date	Status note
10/03/19	<p>Technology and Data Programme and Project Authority for Financial Years 2019/20 and 2021/22: Digital Pocket Map.</p> <p>Members liked the idea of the Digital Pocket Map app and asked whether it could be shared, once a fully functioning version had been created.</p>	Shashi Verma	May 2020	An update will be brought to a future meeting.
25/05/18	<p>London Underground Legacy Signalling and Information: Use of innovative technology</p> <p>The Committee requested a future discussion on the use of innovative technology for signalling upgrade works, such as 5G.</p>	Andy Lord	September 2020	This work is being progressed with the development of future signalling strategies and upgrades. An update will be provided to a future meeting.
13/02/18	<p>Member suggestions for future agenda discussions: Investment Programme value for money</p> <p>Members were keen to better understand what mechanisms and procedures were in place to drive and demonstrate greater value in the delivery of its investment programme. TfL was undertaking an end to end review of project lifecycles to identify how it could identify opportunities and cultural changes to drive better value. An update would be provided to the Committee when this work was better developed.</p>	Stuart Harvey	Ongoing	In progress. An update will be provided to a future meeting.

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Date: 5 March 2020

Item: **Crossrail Central Operating Section (CCOS) Traction Power**

This paper will be considered in public

1 Summary

1.1 This paper sets out the proposed structure for ownership of the assets necessary for the provision of traction electricity to the Crossrail central operating section, between Westbourne Park Junction in the west to Abbey Wood in the south east and Pudding Mill Lane Junction in the east (CCOS) and the contractual arrangements for the utilisation of those assets in the supply of traction electricity to the CCOS.

2 Recommendations

2.1 **The Committee is asked to note this paper and:**

- (a) **approve Procurement Authority for the arrangements that deliver traction power for the operation of passenger train services on the Crossrail central operating section (CCOS) and to authorise Rail for London (Infrastructure) Limited (RfL(I)) to enter into an Electricity Supply Agreement (ESA) with Network Rail Infrastructure Limited (NR) on the basis that, at current estimated consumption and prices and without indexation, the total cost over the 150 year ESA will be in the order of £1.5bn and, over the life of the current Business Plan, outturn costs will be up to £40m;**
- (b) **note that arrangements for power supply for the CCOS described in this paper extend for the life of the proposed leases, being 150 years and provision will need to be made in future business plans to meet the continuing payment obligations under them; and**
- (c) **note that, as part of the completion of the arrangements, a number of agreements will be approved at officer level in accordance with Standing Orders.**

3 Background

3.1 There is a requirement for electricity to provide traction power for train services operating on the CCOS.

3.2 Crossrail Limited (CRL) has funded and is responsible for the delivery of the infrastructure through which this electrical power will be distributed to trains running on the CCOS.

- 3.3 This infrastructure, which is described more fully in section 4 below, will also supply electricity to NR to provide traction power for passenger (including Elizabeth line) and freight services on its network. The NR network will utilise the bulk of the electricity supplied.
- 3.4 CRL, RfL(I) and NR have been in discussions for a number of years around ownership of the traction power infrastructure, responsibility for its operation and maintenance and the arrangements for the supply of electricity to the CCOS and the NR network.
- 3.5 The proposals described in section 5 below, represent the position agreed between the parties.

4 Traction Power Infrastructure

- 4.1 A diagram of the CCOS traction power infrastructure is attached as Appendix 1
- 4.2 The bulk supply points (BSPs) are substations that connect to the National Grid (NG) 400kV transmission network. At each site 400kV is transformed to supply two incoming 25kV feeds. Each feed is capable of supplying both the CCOS and the NR network simultaneously if required.
- 4.3 The connection to the NG network at each of the BSPs is governed by a number of agreements most notably a Connection and Use of System Code Bilateral Connection Agreement (Connection Agreement). These agreements are currently in the name of CRL and under them CRL pays annual connection charges to NG of around £600k to cover operation and maintenance of the BSPs.
- 4.4 The feeds from the BSPs are controlled and distributed to supply traction power to the CCOS by auto transformer feeder stations (ATFSs) and auto transformer stations (ATSs).
- 4.5 The principal supply for the CCOS is via a BSP and ATFS at Pudding Mill Lane. The BSP was constructed by NG and funded by CRL. The ATFS infrastructure was funded and constructed by CRL on land owned by TfL. This infrastructure will also supply power to NR's Great Eastern Line (Bow to Shenfield), in fact some 70 per cent of the output will be utilised on the NR network.
- 4.6 A backup supply to the CCOS is via a BSP and ATFS at Kensal Green which connects to the CCOS via an ATS at Westbourne Park. This infrastructure will primarily supply NR's Great Western Mainline (Paddington to Maidenhead), the Heathrow Spur and Old Oak Common and North Pole depots. The BSP was constructed by NG and funded by CRL. The ATFS was constructed by NR on land owned by TfL and grant funded by CRL. The ATS was funded and constructed by CRL on land owned by NR.
- 4.7 The above is summarised in the table at Appendix 2.
- 4.8 As the CCOS is a high capacity underground railway the traction power infrastructure has been designed and built with a high level of resilience. RfL(I) has the ability to switch to the backup supply arrangements described in paragraph 4.6 (the first alternative feeding) in the event of a failure of the main CCOS supply and will liaise with NR to return to normal feeding arrangements

once the failure is rectified. If there is a failure of both the main and backup CCOS supplies NR will arrange to supply both its network and the CCOS from the NR feed at the Pudding Mill Lane ATFS (second alternative feeding) or, if this is not possible, to supply both networks from the NR feed at the Kensal Green ATFS (third alternative feeding).

- 4.9 CRL is currently supplying traction power to NR from the Kensal Green BSP. NR is in occupation at the Kensal Green ATFS site and is operating and maintaining this facility.
- 4.10 CRL has a supply contract with EDF via the Crown Commercial Service. It recovers the cost of this supply from NR pro rata to NR's usage via Kensal Green together with an agreed percentage of the connection charges payable to NG in relation to the Kensal Green BSP.
- 4.11 TfL granted NR a licence to occupy the NR part of the Pudding Mill Lane ATFS site from 2 December 2019. The supply arrangements referred to in paragraph 4.9 are being amended to facilitate the supply of traction power to NR from Pudding Mill Lane.
- 4.12 The traction power infrastructure was designed at a time when NR was to be the Infrastructure Manager (IM) for the CCOS.
- 4.13 Following the decision in 2012 for TfL (via a wholly owned subsidiary, RfL(I)) to become IM some changes were made to the design of the ATFS site at Pudding Mill Lane to segregate the RfL(I) (i.e. CCOS supply related) part of the site from the NR part. It remains the case, however, that the infrastructure is designed such that the incoming feeds are controlled by NR from their control rooms.

5 Proposed Structure for Infrastructure Ownership and Operation

- 5.1 NR's control of the incoming feeds at both ATFS sites (and their role in switching the CCOS power supply from the Pudding Mill Lane ATFS to the Kensal Green ATFS) has been a critical factor and a key driver in the discussions between CRL, RfL(I) and NR.
- 5.2 The only practical structure to implement and operate is therefore one where NR owns and operates the ATFS sites and is responsible for the supply of electricity to RfL(I) for the provision of traction power for the CCOS.
- 5.3 This arrangement needs to be in place for when RfL(I) becomes IM of the CCOS (the commencement of Trial Running services on the CCOS) and in the case of the supply replaces the CRL arrangements referred to in paragraphs 4.9 to 4.11.
- 5.4 It is proposed that:
 - (a) TfL grants 150 year leases to NR for each of the ATFS site at Kensal Green and the NR part of the ATFS site at Pudding Mill Lane;
 - (b) NR grants a 150 year lease to TfL for the ATS site at Westbourne Park; and
 - (c) NR enters into an Electricity Supply Agreement (ESA) with RfL(I) coterminous with the above leases.

- 5.5 Under the ATFS form of lease NR will be responsible for the operation, maintenance and renewal of the ATFS infrastructure and the related costs.
- 5.6 The ATS lease will be on reciprocal terms.
- 5.7 Under the Sponsors Agreement DfT consent is required for TfL to enter into the ATFS leases. As the leases are between two public sector IMs it is expected that consent will be forthcoming.
- 5.8 As NR controls the incoming feeds from the BSPs it is proposed that CRL novates the Connection Agreements to NR. Both NR and NG have confirmed that this is acceptable¹. NR will assume liability for the connection charges payable under these agreements. Interface Agreements that CRL has with NG at each site which grant access to own equipment on the other party's land will also be novated to NR.
- 5.9 Operational procedures for the ATFS sites including division of responsibilities, operational boundaries, outage planning, taking of isolations etc. are set out in a number of technical documents agreed between NR and RfL(I) engineers which are referenced as appropriate in the ESA.
- 5.10 The ESA and ATFS leases need to be coterminous and stand or fall together as in the event the current structure is collapsed or terminated, TfL/RfL(I) will need the return of the land and ATFS infrastructure affixed to it to make alternative supply arrangements.
- 5.11 Given the potential term of the ESA (150 years), termination could be necessary through, for example, decisions around the provision of public transport via train services or changes in how train services are powered / how that power is delivered or perhaps concerns around NR's long term performance. The agreement contains specific exit provisions including the form and scope of an exit plan to be agreed on the occurrence of such events in addition to a default arising from non-performance by either party.
- 5.12 Under the ESA NR will supply electricity on the same terms it supplies train operating companies (TOCs) on its network² (including Rail for London Limited (RfL)'s concession operators – currently MTR Corporation (Crossrail) Limited (MTR) and Arriva Rail London Limited). This will be at cost which comprises the wholesale cost plus green levies and share of delivery costs. NR will consult with

¹ Novation to NR is subject to satisfactory resolution of a harmonics assessment required by NG for the Pudding Mill Lane ATFS. This assessment requires operation of an 8 trains per hour service for 4 weeks which can't occur until the PML ATFS is feeding NR's Great Eastern Line. Computer simulations carried out by CRL predicted final harmonic levels will be within the NG specified limits and earlier this year harmonic monitoring was carried out while CRL ran four class 345 trains in the CCOS fed from Pudding Mill Lane and the results were well within limits. In the unlikely event of any mitigation / rectification measures being required these will need to be procured by CRL to NG's satisfaction.

² NR is the biggest procurer of electricity in the UK. It currently has a 10-year supply contract with EDF which it expires in 2024. Traction electricity costs are part of NR's regulated cost base and are subject to review by The Office of Rail and Road (ORR) to ensure they are economic and efficient. The consideration for Control Period 6 is detailed in pages 125 – 127 of https://orr.gov.uk/_data/assets/pdf_file/0018/39312/pr18-final-determination-review-of-network-rails-proposed-costs.pdf.

RfL(I) if any changes are proposed in terms upon which it supplies electricity to TOCs at the same time as it consults with the TOCs.

- 5.13 RfL³ will have the ability to instruct NR, via MTR / RfL(I), to execute its procurement strategy for electricity for consumption on CCOS (e.g. volumes to be bought forward and for what period) in the same way it does now for MTR's consumption on the NR network.
- 5.14 In the event of a failure of supply NR will forward the appropriate proportion (pro-rata to usage) of any compensation it receives from third parties (e.g. NG). It will not compensate RfL(I) for the non-provision of power to the CCOS due to its own failures as it is not funded to do so.
- 5.15 RfL(I) takes comfort from the fact that NR is incentivised to operate and maintain the assets effectively as it will be liable to train operators on its network (under their respective Track Access Contracts) for any delays attributable to failures / unavailability of the ATFS equipment and also that its asset stewardship and performance is subject to regulatory oversight. The ESA contains explicit provisions requiring NR to treat RfL(I) in the same way as TOCs on its network.
- 5.16 RfL(I) has specified a power requirement in the ESA that is sufficient to run 30 trains per hour through the CCOS. The planned Elizabeth line service is for a 24 trains per hour service in the peaks.
- 5.17 NR will invoice RfL(I) on the basis of readings from meters associated with the infrastructure. As initially there will only be one operator on the CCOS (namely MTR), these bills will form the basis of charges levied for traction power by RfL(I) to MTR under its Track Access Contract for the CCOS. Upon such time as there is another train operator on the CCOS RfL(I) will need to invoice for traction electricity on the basis of readings from train meters. NR has an established process for converting train meter readings to consumption suitable for invoicing and has advised they can extend these arrangements to the CCOS if required.

6 TfL Energy Strategy

- 6.1 TfL's Energy Strategy aims to meet the London Environment Strategy's ambition for all TfL-controlled rail services to be wholly powered by zero carbon sources by 2030. However, this target excludes services for which electricity is purchased through NR (such as currently RfL Concession Services on the NR network and London Underground (LU) services on the Waterloo and City Line) and will thus exclude services on the CCOS.
- 6.2 Under NR's current supply contract with EDF Energy electricity supplied to NR (and onto RfL(I), RfL's Concession Operators and LU) is 'matched' by low-carbon power from EDF Energy's eight nuclear power stations.

³ Under the Concession Agreement RfL takes volume and price risk for traction electricity for MTR services on the CCOS. It funds MTR to pay traction electricity charges to RfL(I) who in turn pays NR for the supply.

6.3 NR intends to develop a strategy for traction CO₂ emissions reduction in CP6⁴ and this will then inform the procurement of its replacement traction electricity supply contract in 2024.

7 Financial Implications

7.1 The cost of traction power for the CCOS has been included in the TfL Business Plan at a cost that is consistent with the proposed supply from NR.

7.2 The traction power cost in the first full year of operation of a 24 trains per hour service through the CCOS is £10m.

7.3 The transaction costs of completing the above arrangements are included in the 2020 Budget.

List of appendices to this report:

Appendix 1: CCOS Traction Power Infrastructure Diagram

Appendix 2: CCOS Traction Power Infrastructure Summary

List of Background Papers:

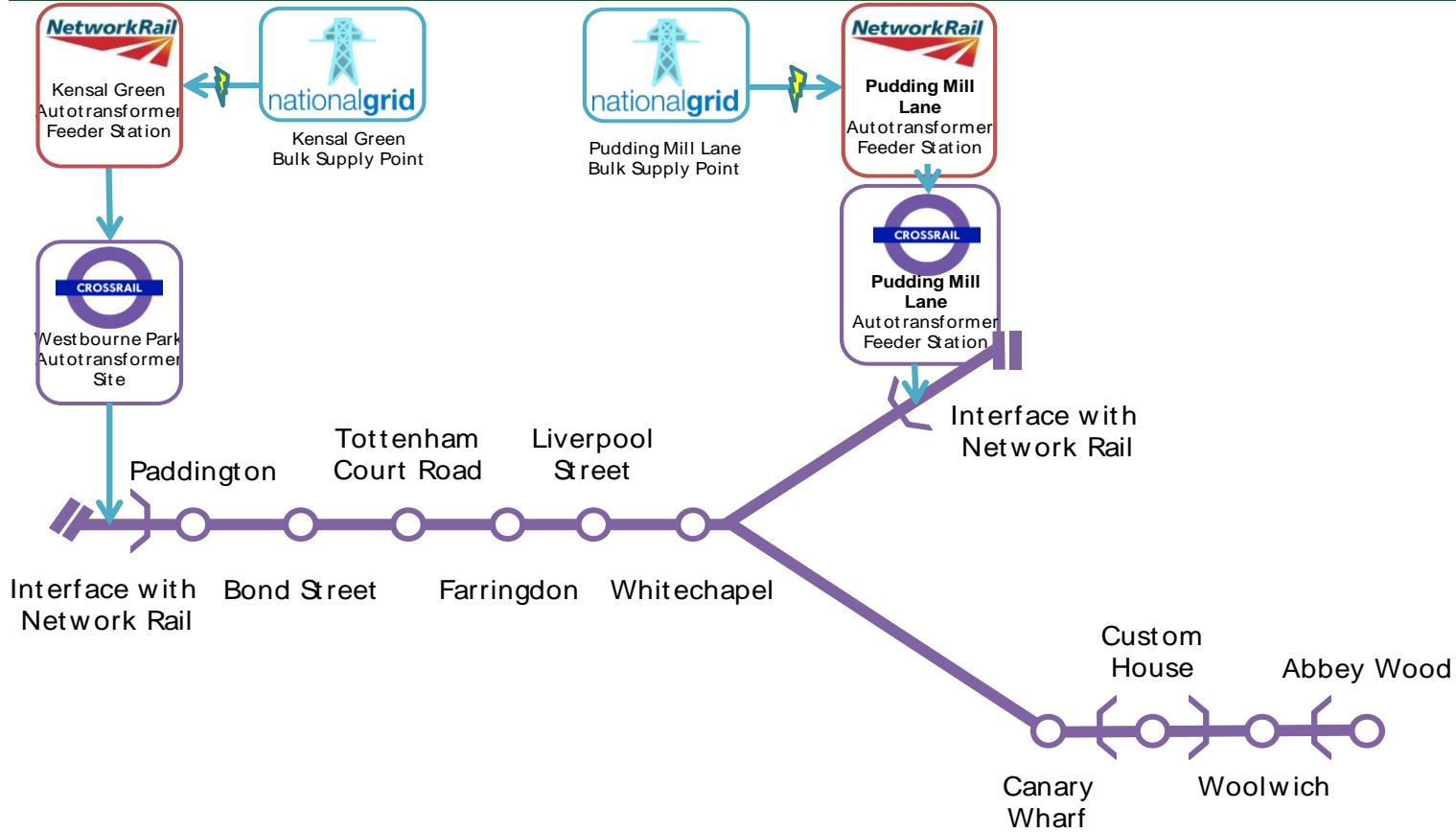
None

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⁴ The scope of NR's current Energy & Carbon Strategy is NR's own operational energy use and CO₂ emissions, essentially, its non-traction portfolio.

Appendix 1: CCOS Traction Power Infrastructure Diagram

Traction Power Organisations



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Appendix 2: CCOS Traction Power Infrastructure Summary

	Constructed by	Funded by	Ownership - Current	Ownership - Proposed	O & M ¹ - Proposed	Connection Agreement - Current	Connection Agreement - Proposed	Beneficiaries
BSPs								
Kensal Green	NG	CRL	NG	NG	NG			See ATFS below
Pudding Mill Lane	NG	CRL	NG	NG	NG			See ATFS below
ATFSs								
Kensal Green	NR	CRL	TfL	NR via long lease	NR	CRL	NR	MTR (NR and CCOS), First Great Western, Heathrow Express, Freight, Hitachi (North Pole Depot), Bombardier (Old Oak Common Depot)
PML (NR part)	CRL	CRL	TfL	NR via long lease	NR	CRL	NR	MTR (CCOS and NR), Abellio, c2c, Freight
PML (RfL(I) part)	CRL	CRL	TfL	RfL(I) via lease	RfL(I)	N/A ²	N/A ³	MTR
ATSS								
Westbourne Park	CRL	CRL	NR	TfL via long lease, sub lease to RfL(I)	RfL(I)			MTR
Stepney Green, Plumstead	CRL	CRL	TfL	RfL(I) via lease	RfL(I)			MTR

¹ Operations and Maintenance

² Connection to BSP is via NR part of ATFS

³ ibid

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Programmes and Investment Committee



Date: 5 March 2020

Item: Investment Programme Report – Quarter 3, 2019/20

This paper will be considered in public

1 Summary

1.1 The Investment Programme Report describes the progress and performance in Quarter 3, 2019/20 of a range of projects that will deliver world-class transport services to London.

2 Recommendation

2.1 **The Committee is asked to note the report.**

List of appendices to this report:

Appendix 1: Investment Programme Report Quarter 3, 2019/20.

List of Background Papers:

None

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Transport for London investment performance report

Quarter 3 2019/20
(15 September - 7 December 2019)

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45 About Transport for London (TfL)

Introduction

This investment programme quarterly performance report provides an update on a range of projects that will create world-class transport services in London

The report gives a progress update on the major projects and sub-programmes that seek authority each year (unless extraordinary approvals are needed) from the Programmes and Investment Committee each year.

For each major project or programme, the financial and milestone data represents the position at the end of the quarter and we include commentary for key achievements and progress made. The report also contains, as far as possible, updates on any notable progress made after quarter end.

For a programme and project with a defined start and end, we include when it is planned to be substantially complete and being used by customers. Works that are delivered in a prioritised sequence, such as road resurfacing or track renewal, are referred to as 'annual' as they are controlled and measured within each financial year. This report only provides an update on progress with committed projects and programmes.

Financial records of spend to date, authority and estimated final costs (EFC) represent the entire duration of each separate project or programme, except for annual portfolios where spend to date, authority and EFC figures represent the current financial year.

Where authority is significantly lower than EFC, it has been given for the current stage of works and further authority will be sought when it is appropriate.

To ensure continued transparency across our organisation, the reporting EFC for projects is based on the current risk profile and opportunity realisation at the time of publication. As a result, project EFC could fluctuate every quarter, however this does not automatically mean there is an increase in spend authority.

The EFC of each sub-programme or project may display a red, amber or green (RAG) status, which represents the level of change in EFC from the previous quarter, such as:

EFC increase of two per cent or more:



EFC increase of five per cent or more:



EFC decrease of two per cent or more:



EFC decrease of five per cent or more:



Where no symbol is used, the EFC increase or decrease (if any) is less than two per cent.

We also include cumulative EFC movements for savings and efficiencies that have been embedded since our 2019 Business Plan, while protecting safety, services and reliability. Numbers in brackets represent an EFC increase and numbers without brackets represent an EFC decrease. Commentary is provided for cumulative movements greater than £2m.

This report does not contain commercially sensitive information and therefore some EFCs and authorities are marked with an asterisk until the main contract has been awarded. On schemes where there is commercial confidentiality, the EFC, authority and spend to date may also be withheld until a later date.

All financial figures are gross and may not appear to align with costs detailed in the TfL Budget, which are net of any third-party funding. In addition to the committed projects and programmes included in this report, we will seek to obtain capital spend authority for schemes such as the Bakerloo Line Extension and Crossrail 2.

Each programme or project also has an overall RAG milestone status, representing the average forecast date variance against plan for 2019/20 strategic milestones:

On time or early:



1-89 days late:



90 or more days late:



N/A (without 2019/20 strategic milestones):





HYBRID CLEANER AIR FOR LONDON

Strategic milestones for 2019/20 – the key milestones listed in the TfL Budget – are detailed in the Appendix (page 43).

Our investment programme is delivered by the following areas of the business: Major Projects, London Underground, Surface Transport and Other, and the report structure reflects this.




- Major Projects is responsible for our largest and most complex projects. It comprises line upgrades, network extensions and major stations, which are covered on pages 12-19. Future Projects (see page 19) will be reported in detail following financial authority approval
- London Underground comprises stations, accessibility, track renewals, power, cooling and energy, rolling stock renewals, and signalling and control, which are covered on pages 20-24
- Surface Transport comprises Healthy Streets, Air Quality, Public Transport and Asset Investment. These are covered on pages 25-36
- Other comprises Technology and Data, TfL Growth Fund and the Elizabeth line (including Crossrail), which are covered on pages 37-42

Mayor's Transport Strategy themes

The Mayor's Transport Strategy sets out a bold vision for a growing, welcoming London, where 80 per cent of journeys will be made by walking, cycling or public transport by 2041.

We are making streets healthy, pleasant and productive places to stop at, travel through and live on. Listening to and acting on suggestions from our customers will enable us to make walking, cycling and public transport the first choice for the vast majority of trips, and everyday operational excellence will unlock the new jobs and homes our city needs.

This report looks at our investment programme in respect of the following themes from the Mayor's Transport Strategy:

-  Healthy Streets and healthy people
-  A good public transport experience
-  New homes and jobs



People enjoyed Car Free Day celebrations across London's streets

Business at a glance

Keeping London moving, working and growing to make life in our city better

How we report on our business

Underground

London Underground

Elizabeth line

Currently operating as TfL Rail

Buses

London Buses

Streets

TfL Road Network

Rail

DLR, London Overground and London Trams

Other operations

London Dial-a-Ride, London River Services, London Taxi and Private Hire, Santander Cycles, Victoria Coach Station and Emirates Air Line, Crossrail 2, Planning and other Group Items

Major projects

Responsible for our largest and most complex projects

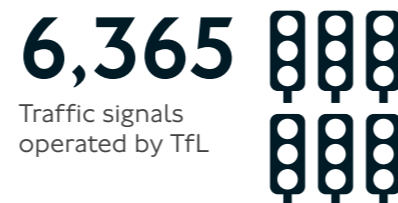
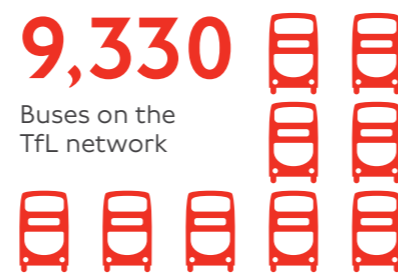
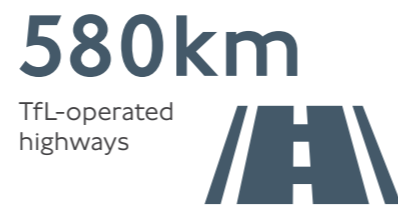
Property

Our commercial and residential estate and building portfolio

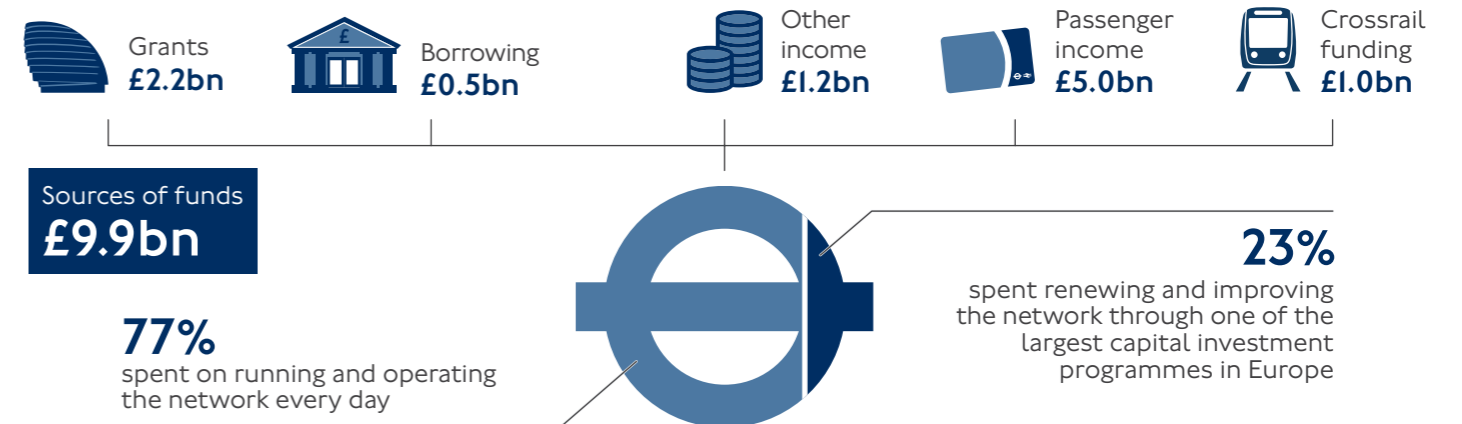
Media

Advertising estate and digital marketing infrastructure

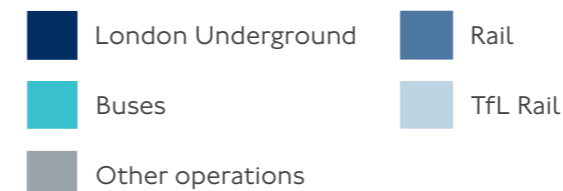
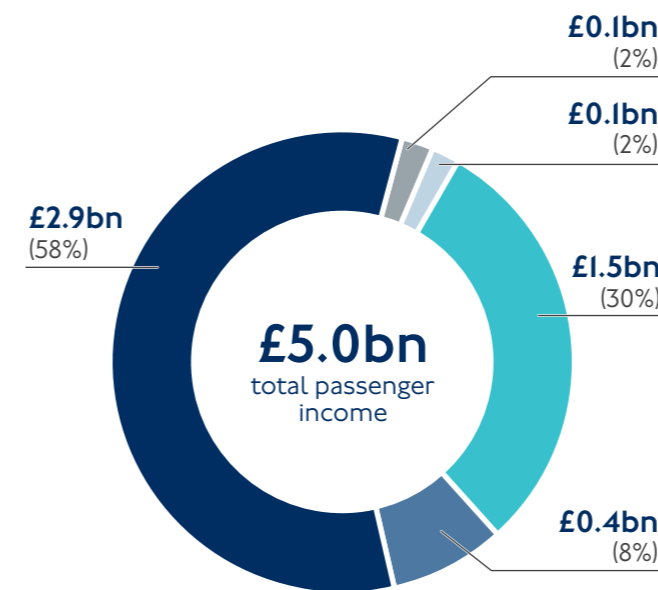
Facts and figures



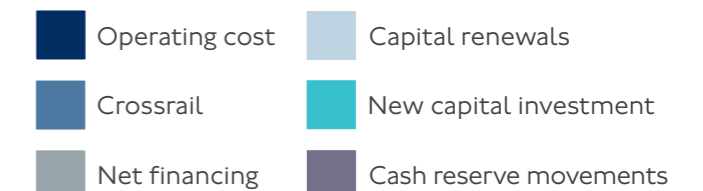
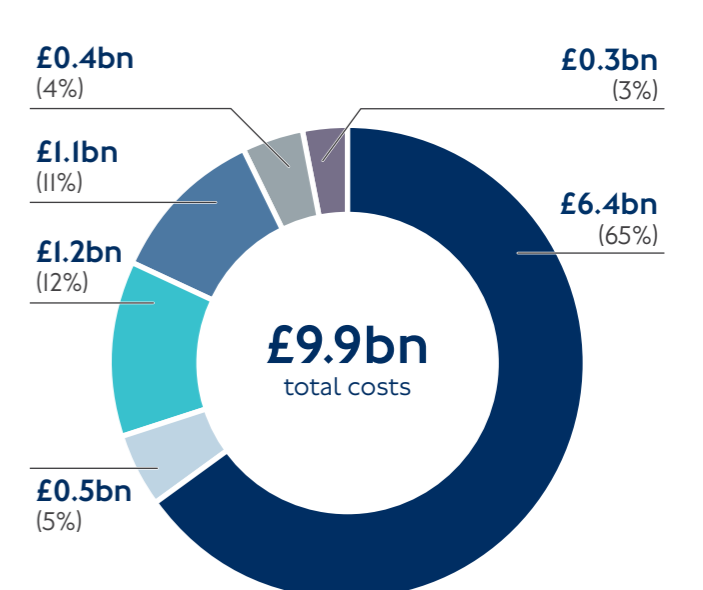
Revised target at a glance



Total passenger income



Total costs





Page 35

Health and Safety

Our customers

Across the public transport network, there were two customer fatalities and 502 people were seriously injured during Quarter 3, which is a decrease of 20 (3.8 per cent) when it is compared with the same quarter in 2018/19.

Our workforce

There were a total of 419 injuries to our workforce during Quarter 3, and two tragic deaths of Christian Tuvi and Kenneth Matcham. The total number of injuries sustained by our workforce decreased by 25 (5.6 per cent) when compared to Quarter 3 2018/19. Across our construction and projects activities, 34 workers were injured, the majority were employed by our suppliers (91.2 per cent).

On our streets

During Quarter 3, 37 people were killed on London's roads, which is up 32 from the same period in 2018. However, overall the provisional figures for July to September show improvement in terms of the level of serious injuries, where we saw a reduction of eight per cent to 991 when compared to the same quarter last year.

[See our quarterly Safety, Health and Environment report for further information.](#)

Key achievements

Major projects

Line upgrades

Four Lines Modernisation

At Upminster Depot, all site works have been completed including the extended wheel lathe, new training rooms, and upgraded cleaning, maintenance and lifting sheds. These facilities are now back in use.

We have commissioned and handed over the train stabling shed at Ealing Common Depot. This gave back four train stabling roads and has provided greater stabling flexibility. This milestone was achieved three days ahead of schedule.

Railway system enhancements

To enable the new capacity works, we have completed speed improvement and track works to the Northern line and continue to focus on delivering power enhancement.

Network extensions

Northern Line Extension

For the first time, the UK Power Networks (UKPN) transformer rooms have been energised at Kennington Green and Kennington Park. Achieving UKPN power-on is a key step towards getting the Northern Line Extension operational.

In the Kennington area we completed the Vehicle Control Centre 2 signalling system works over the Christmas and Boxing day closure. The works were successfully executed over the two days due to months of detailed preparation works, which were undertaken by the project teams and contractors.

Battersea Power Station and Kennington shafts were awarded Gold and Nine Elms station won Silver at the 2019 Considerate Constructors Scheme National Site Awards.

Major stations

Bank station upgrade

We have completed the excavation of the final two cross passages to connect the new escalator barrel to the Central line. When the project is finished, this will reduce journey times and ease congestion relief from the Central line to the Northern line and DLR.



We achieved power-on as part of the Northern Line Extension



London Underground

Stations

At Finsbury Park, a new western entrance was opened on 17 December 2019 and the station is now step-free.

Track renewals

In September 2019, we achieved a key milestone by installing 3.4km of new ballasted track.

Rolling stock

On the Jubilee line, all 63 trains have been refurbished and are back in service. The refurbishments include a new wheelchair area, new flooring, refreshed exterior and interior (including grab-poles and handles), and new roof and window sealing. We have started to install the new priority seating moquette. The fleet is now compliant with Rail Vehicle Accessibility Regulations.

Surface

Healthy Streets

Walking and cycling

Construction for Cycleway 4 is progressing well at the two sections of Jamaica Road and Rotherhithe Roundabout and is on track to be completed by May 2020.

Detailed design for the Kew Bridge section of Cycleway 9 was completed in September 2019. London Borough of Hounslow's Cabinet approved the scheme within the borough in September 2019. We have now constructed 31 safer junctions and all of them have had mitigation measures introduced to reduce road danger. The London Borough of Camden has completed the majority of the works on Tottenham Court Road, which is now operating two-way (buses and cyclists only southbound).

Air quality and fleet compliance

To help meet the Mayor's Air Quality objectives in 2020, we are upgrading the entire bus fleet to meet Euro VI emissions standards. This includes retrofits of up to 4,000 midlife buses, of which 3,600 have already been completed. We have also delivered all 12 Low Emission Bus Zones one year earlier than planned.

Under the ultra-low emission vehicles rapid charging infrastructure scheme, the total number of charge points installed reached 200 in September 2019 and 225 in December 2019. This is a major step towards our target of 300 rapid charge points by December 2020. There are more than 2,500 zero-emission capable taxis licensed in London. Of the rapid charge points that have been installed under this scheme, 73 are dedicated to taxi use.

Public transport

West Hampstead London Overground station is now fully accessible after two new lifts were brought into use. The final work on the platforms has been completed, which has increased the size to relieve congestion during peak times.

On the DLR, Poplar Depot high voltage equipment has been built and tested off site. Stratford high voltage system has been commissioned. The contractor is on site and surveying a number of stations for the installation of additional Oyster validators.

On London Trams, key highlights this quarter include the substantial completion of highway reconstruction works for the Blackhorse Lane Bridge Replacement project, with a single-lane opening on 9 December 2019. The full re-opening will follow in March 2020. We also completed waterproofing works on another of our road bridges, Addiscombe Road Bridge.

Other

Technology and Data

Last quarter, we completed daily processing changes for contactless payment, which now enable customers to receive their refunds at any reader across our network.

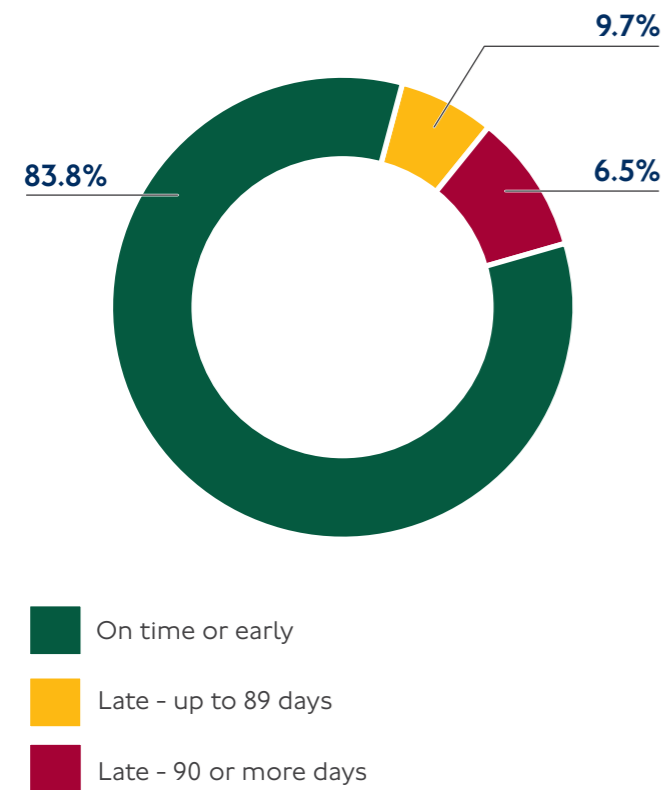
Following a successful trial over the last seven months, our Bus Speed Compliance Tool is now a fully supported application that will transform our capability to understand the extent of speeding infringements across our bus network.

The design phase for the 4G pilot project on the underground network is complete. We have started installation work at all pilot sites and completed work in seven of the 16 tunnel bores.

Our smart working programme is a key enabler for our accommodation strategy, and the resulting move to having seven desks for every 10 people in our main head office buildings.

2019/20 strategic milestone performance strategy

The overall performance for all TfL 2019/20 strategic milestones is summarised here:



The late milestones are shown in the Appendix on page 43.



Our signalling system was extended from Latimer Road to Euston Square

Major projects

Line upgrades 

Four Lines Modernisation

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2023	4,840	5,412

2019/20 strategic milestone RAG

The first section of the new signalling system was successfully introduced in 2019. Last quarter, operation of the new signalling system was extended from Latimer Road to Euston Square on the Circle and Hammersmith & City lines and from there to Finchley Road on the Metropolitan line, and to Paddington on the District and Circle lines.

November saw unexpected levels of disruption, particularly on the Metropolitan line. The supplier has responded positively with a range of measures to improve track to train communications and other contributing items.

Trackside works and software deployments took some time to implement, however we are now starting to see improvements. Further works are planned for progressive implementation over the next three months. All planned works will be completed prior to further roll out of the system into new areas.

The schedule for the software development for the remaining migration areas is under review and we are working with our supplier to arrive at a mutually agreed schedule.

Commissioning of the final signalling area between Rayners Lane and Uxbridge stations remains on schedule to support the final service frequency increases in 2023.

EFC (£m)	EFC movement post plan (£m)
5,351	2

The movement in EFC since the 2019 Business Plan reflects the latest view of the risk profile and the realisation of opportunities.

The EFC remains £61m under authority. The creation of headroom by driving out cost was a deliberate strategy to ensure later headwinds within the complex programme could be dealt with efficiently. The reductions have been achieved through value engineering solutions, innovation and providing the optimum scope to bring about the planned benefits.

The programme continues to periodically review scope, schedule, outturn costs, risks and opportunities in order to mitigate further increases.

We have already introduced 192 new S-stock trains on the Circle, District, Hammersmith & City and Metropolitan lines.

All the S-stock fleet, which comprises 59 eight-car trains for the Metropolitan line and 133 seven-car trains for the Circle, District and Hammersmith & City lines, has been fitted with automatic train control equipment to support communications-based train control. This work has been completed ahead of, and in readiness for, commissioning the automatic train control system in the remaining signalling areas of the subsurface railway network.

We have completed all site works at Upminster Depot including the extended wheel lathe, new training rooms, upgraded cleaning, maintenance and lifting sheds. All these facilities are back in use.

At Ealing Common Depot, we commissioned and handed over the train stabling shed. These sheds are used to store the trains when they are not being used. Giving back four stabling roads gives increased stabling flexibility. This milestone was achieved three days ahead of schedule. Shed 2 has also been commissioned and works to the remaining shed are on target to be completed by the end of the year. In addition, extensive track replacement has been completed at the depot following recommendations from an investigation into train derailments.



Railway System Enhancements

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2024	121	245

2019/20 strategic milestone RAG

This programme includes upgrades to signalling, power, trains and track to maximise capacity on the Jubilee and Northern lines with the existing train fleets. While many of the works are standalone, a significant proportion are essential to other programmes, these include further upgrades to the Jubilee line and the opening of the Northern Line Extension, as well as the reconfiguration of the Northern line at Bank.

To enable the new capacity works, we have completed speed improvement and track works to the Northern line and continue to focus on delivering power enhancement works. Site activities have commenced for the installation of a new wheel lathe at Morden Depot.

Enhancements to the Jubilee line continue and include improving the speed at which trains exit the depot onto the mainline at Neasden. A tender was issued in September 2019 for the signalling works.



Piccadilly Line Upgrade – rolling stock and enabling

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2030/31	150	3,294

2019/20 strategic milestone RAG

This programme is designed to deliver a fleet of newly designed, high-capacity, walk-through, air-cooled trains to replace some of the oldest on our network.

We have carried out exercises to learn lessons from previous programmes, and these have been embedded into the plan to achieve the preliminary design milestone in Quarter I 2020/21. To accelerate this phase, we have taken part in a number of detailed design reviews at the Siemens premises in Germany and Austria. This has ensured we progress to the preliminary design on schedule.

We are focusing on taking the one-person operation CCTV through commercial assurance in Quarter 4 so that we can award the contract for this sub element of the overall programme.

EFC (£m)	EFC movement post plan (£m)
196	(1)

The increase in EFC since the 2019 business plan is driven by higher than anticipated Jubilee line optimisation estimates. These are under review and the goal remains to drive the cost down.

EFC (£m)	EFC movement post plan (£m)
2,959	6

The EFC and spend authority only relates to works and enabling associated with the Piccadilly line trains introduction programme. Work continues to support the case to gain funding for additional scope regarding the Deep Tube Upgrade Programme.

During Quarter 3, the concept design milestone for the 94 Tube trains was achieved on time. The reduction in the quarter is as a result of ongoing risk management actions to lower the risk profile of the works, as well as a review of professional services spend.



We will replace 60 per cent of the DLR fleet with new trains



DLR Rolling Stock and Systems Integration

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2025	31	603

2019/20 strategic milestone RAG

New DLR trains and infrastructure are vital to support the ongoing regeneration of the east London area, including housing growth and new business opportunities.

The programme will replace 60 per cent of the existing DLR fleet which is nearing the end of its design life and will provide additional trains, increasing capacity to meet the projected housing and employment growth in the Docklands area. The depot at Beckton will be extended, with further sidings for the new trains, a new maintenance facility and an extended automatic train operation test track. The Thales automatic train operation signalling system also requires updating and the traction power system needs to be strengthened.

The contract for the supply of the next generation of DLR trains by Construcciones y Auxiliar de Ferrocarriles (CAF) is underway and good progress is being made towards the completion of the preliminary design work.

At Beckton depot, enabling works have started on site. Tenders have been received for the Southern Sidings build package and for the new Maintenance Facility Building detailed design package.

Thales have been contracted to upgrade the signalling system to enable the use of the new trains. This is an upgrade of the existing Thales Seltrac system.

EFC (£m)	EFC movement post plan (£m)
602	1

Savings have been made on depots infrastructure, generated through materials procurement, and through challenges to the requirements for switches and crossings - moving to semi-weld as opposed to cast crossings. The saving was partially offset by costs associated with currency hedging options.

Network extensions

Northern Line Extension

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2021	860	1,260

2019/20 strategic milestone RAG On Track

The Northern Line Extension (NLE) is a twin-tunnelled extension from Kennington to a new terminus at Battersea Power Station, via a new station at Nine Elms. This supports the regeneration of the Vauxhall Nine Elms Battersea Opportunity Area.

Good progress continues to be made across all NLE work sites. All primary civils and structural work has been completed. The main focus is now on fitting-out and installing the power supply at Nine Elms station, Battersea Power Station and the two new head houses at Kennington. We are also extending the Northern line signalling system into the extension.

In the Kennington area we completed the Vehicle Control Centre 2 signalling system works over the Christmas and Boxing day closure. The works were successfully executed over the two days due to months of detailed preparation works undertaken by the project teams and contractors.

At Nine Elms station, entrance glazing has been completed and construction of the canopy frame above the station entrance has commenced. The exterior louvre framework installation has started and reconstituted stone cladding to the eastern entrance is complete. Power transformers have been delivered and positioned in the transformer room. Three escalators have been lowered into position between the ticket hall and platform levels.

EFC (£m)	EFC movement post plan (£m)
1,134	13

During Quarter 3, the EFC reduced, reflecting reassessment of the dynamic systems testing forecast in the latter part of 2020. This was achieved from a better understanding of the requirements for staff and test trains, cost estimate reductions from railway systems packages.

The EFC is underpinned by a revised forecast developed following the supplementary agreement executed in June 2019 with the project's primary main works contractor, Flo.

At Battersea station, the west end of the site has been handed over to Battersea Power Station Development Company, which will enable the construction of the over-station development (Norman Foster Building) to commence. Tunnel ventilation fans have been delivered and lowered into the fan room beneath the western ramp. Installation of the third escalator bank has begun. UKPN is installing the cables to connect mains electricity to Nine Elms and Battersea stations.

For the first time, the power transformer rooms at Battersea Power Station, Nine Elms Station, Kennington Park Headhouse and Kennington Green Headhouse have been energised. Achieving power on across the whole of the NLE is a significant step forward as it supports the testing and commissioning activities required for getting the NLE operational.

Work continues on making both Kennington head houses watertight and fitting the architectural cladding. The ventilation works at Kennington Green are progressing well. At Kennington Park, installation of ductwork and cable management system brackets continues in the basement and blockwork wall construction in basements two and three.

Battersea station and Kennington shafts were awarded Gold and Nine Elms station won Silver at the 2019 Considerate Constructors Scheme National Site Awards.



Silvertown Tunnel

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2025	59	*	*	*

2019/20 strategic milestone RAG

The Silvertown Tunnel will tackle traffic congestion at the Blackwall Tunnel and the consequential effects this has on travel, the environment, the economy and growth across the east and southeast London.

The tunnel will connect Silvertown and the Greenwich Peninsula, which are areas being developed by third parties with numerous tenants and landowners. The new twin-bore tunnel, within the extended Ultra Low Emission Zone (ULEZ), will effectively eliminate congestion and help improve air quality, with no increase in carbon emissions. It will also provide several new cross-river bus routes in east London, operating at least 20 buses per hour in each direction, all of which are expected to be zero emission.

User charge is a fundamental part of the scheme. There will be packages of local improvements with host boroughs and improved network resilience.

Following an extensive tender process, the design, build, finance and maintenance contract was awarded to Riverlinx consortium on 21 November 2019.

We are in discussion with third parties to put in place the relevant agreements for land access. We are also working with the utility companies to plan the required service diversions. We continue to monitor existing structures and noise levels ahead of the construction phase.



Barking Riverside Extension

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2022	106	287	289	(3)

2019/20 strategic milestone RAG

We are delivering a new rail link to serve the 10,800 new homes planned for the Barking Riverside development area. We will build a spur from the Tilbury Loop line east of Barking, to extend our service to Barking Riverside.

Since the contract was awarded in December 2018, several key milestones have been achieved. These include securing planning permission for the new Barking Riverside station and viaduct structure, and a two-week long blockade of Network Rail lines to deliver essential groundworks for the viaducts.

We are making good progress on the new Barking Riverside station, where the pier walls have been constructed and deck spans have been installed. We have also started pouring the deck slabs. More than 70 per cent of the piling has been completed across the site and we are now working on the pile cap foundations and pier walls for the viaducts. A series of successful weekend possessions of Network Rail infrastructure have been completed in preparation for significant signalling works which were also successfully completed in possessions during the Christmas holiday period.

EFC (£m)	EFC movement post plan (£m)
289	(3)

During Quarter 3, there have been a number of challenges following the discovery of utility services that needed to be diverted. The number of diversions and time it will take to divert them, or to redesign the infrastructure, are putting considerable pressure on the programme.

The movement in EFC reflects these issues. The project continues to review all options to mitigate the associated costs and formalise the contractual position with the main works contractor and recover the delay.

* This information is withheld for reasons of commercial sensitivity.

Discovery of uncharted utilities within the viaduct ramp area and at remaining viaduct pier locations across the site represents a major risk to programme. There has been progress in reducing both the number and impact of these issues. These mitigations included redesigning the pier foundations to reduce the impact of utility service diversion timescales.



The Barking Riverside Extension will help serve new homes

Major stations

Victoria station upgrade and finishes

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2019	580	604

2019/20 strategic milestone RAG 

At Victoria, we have built a new north ticket hall and 300 metres of subways. We have also increased the size of the south ticket hall by 50 per cent. Step-free access to all platforms is now meeting the needs of the 83 million customers, rising to 105 million when interchange flows are included, who use the station each year.

The station and the surrounding buildings are largely complete with only minor works outstanding. A design study is underway to identify how best to utilise the former retail units at 175-179 Victoria Street. The delivery and funding mechanism for any solution, which must be acceptable to Westminster City Council, has yet to be determined.

EFC (£m)	EFC movement post plan (£m)
585	0

The EFC remains static and £19m below authority. Works on site have now been completed and we are working towards the finalisation of the project.



Bank station upgrade

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2022	477	656

2019/20 strategic milestone RAG 

We are boosting capacity at Bank station by 40 per cent. This includes creating a new Northern line tunnel, platform and circulation spaces, a new entrance on Cannon Street, the introduction of step-free access to the Northern line, additional interchange between the DLR platforms, and two new moving walkways between the Central and Northern lines.

Bank station continues to make significant progress. We are working on the dividing walls to create operational rooms across 11 floors at the new station entrance on Cannon Street. Preparation for the fit out stage will start in Quarter 2020/21.

We have excavated the final two cross passages to connect the new escalator barrel to the Central line. This will reduce journey times from the Central line to the Northern line and DLR. Secondary lining works to the new southbound Northern line platform tunnel have been completed and the structural work to house the two new moving walkways is nearly complete. Secondary lining works to the escalator barrel from the new ticket hall to the Northern line has also started.

EFC (£m)	EFC movement post plan (£m)
665	(2)

The EFC has increased by £2m since the 2019 Business Plan was set, owing to a changed risk profile to deliver the upgrade. Risk mitigation reviews continue to be held each period, along with opportunities to reduce the current EFC. We continue to collaborate with the main works contractor to identify and realise potential savings with a view to reduce the EFC back to authority.



High Speed 2

Forecast completion year

TBC*

Spend to date (£m)

8

Spend authority (£m)

11

2019/20 strategic milestone RAG

High Speed 2 (HS2) is a new high-speed railway connecting London to the West Midlands and the North of England. Our work consists of new TfL assets, infrastructure and operational facilities at Euston and Old Oak Common.

On 11 February and after consideration of the Independent Oakervee Review, it was announced that HS2 will go ahead to deliver North-South connectivity, greater capacity and shorter journey times, with construction for the first phase between London and the West Midlands set to begin in April. We are supportive of HS2's benefits to London and the UK, but stressed to the Oakervee Review panel that any solutions considered must include both Euston and Old Oak Common stations.

We are working with HS2 Limited to support the early works programme to minimise disruption at Euston. This includes alternative solutions for utilities diversions on Euston Road and Hampstead Road to minimise the impact on the road network.

In November 2019, we reviewed designs for the TfL elements of the new HS2 Euston station. We continue to work collaboratively with HS2 to ensure the designs achieve the best outcomes for London.

* The forecast completion date is to be determined following the decision on 11 February 2020 to go ahead with the HS2 project.

EFC (£m)

45 ▼

EFC movement post plan (£m)

1

This project is fully refundable by HS2 Limited and the scope of works is dependent on third party requirements. Since the 2019 Business Plan was set, the client has instructed changes to the scope of works, which are reflected in the current EFC.

Future projects



We continue to develop major projects – currently at an early stage – that will deliver the new homes and jobs that London and the UK need.

Bakerloo Line Extension

We have continued to develop our plans to extend and upgrade the Bakerloo line to support development and regeneration in southeast London. It will transform capacity and connectivity across London and the South East. The extension could relieve congestion on overcrowded lines, open up wider opportunities to more people and improve air quality. It would support thousands of jobs and homes in the New Cross, Lewisham and Catford and Old Kent Road Opportunity Areas.

We are working closely with Network Rail, the Greater London Authority (GLA) and the London Boroughs of Southwark and Lewisham, to make sure we can deliver the best possible scheme. The latest round of public consultation closed on 22 December. The consultation sought views on new features, including the proposed route of the tunnels, proposed worksite locations, a new proposal for a combined new Bakerloo and Northern line station entrance at Elephant & Castle, and the possible names for the stations on Old Kent Road. We are analysing the results and will publish the report shortly. Following the public consultation, we will continue to develop the scheme, including working with central Government, the GLA and local authorities to develop a funding agreement for the scheme and safeguard the preferred route alignment.

Crossrail 2

The Crossrail 2 Strategic Outline Business Case (SOBC) was submitted to the Government in June 2019, and was considered by the the Department for Transport (DfT) Board Investment and Commercial Committee in late October. The DfT has confirmed that the SOBC satisfies HM Treasury's Green Book guidance in terms of making a case for change and exploring a preferred way forward. Additionally, it was confirmed that the SOBC is technically robust at this stage of development. The DfT commented on the high quality of the document and stated no further work is required on the SOBC at this time, and it could therefore be used to support a decision on the project at the next Spending Review.

In the meantime, we are working on the 2019 cost estimate for the scheme. The team is working closely with the DfT to ensure that variable factors are applied consistently and is using benchmarking data from Crossrail and other major infrastructure projects to inform the estimating process. The estimating process is subject to an assurance process and has been assessed as appropriate. This week will result in an updated cost estimate for the scheme in the spring.

We have also been learning lessons from industry experts on the pros and cons of various consent processes, including legal advice, outline costs and benefits for each consent mechanism.

London Underground

Stations 

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2022/23	157	535	1,132 ▼▼	0

2019/20 strategic milestone RAG On Track

The targeted renewal of existing assets will improve safety and reliability. Station enhancements will reduce congestion and improve customer journey times.

Station developments

We are working with Berkeley Homes to create a new western entrance at West Ham station, which will provide a direct route into the Jubilee line areas of the station from the development site. The developer’s consultants have drafted the concept design specification documents and we are currently working together to finalise agreements.

We have created 11 retail units in the railway arches beneath Wood Lane station, where we continue to install core services. This work is nearly complete and the first units are now being fitted out for the new tenants to start trading soon.

At Paddington, we are working with Great Western Developments to construct a new entrance to the Bakerloo line, with a much enlarged ticket hall and step-free access to the platforms, as part of its redevelopment of adjacent buildings.

We have been working closely with the developer, Network Rail and Great Western Railway, to ensure everything is in place for our proposed commencement of construction work in spring 2020.

At Stratford, we continue to work with stakeholders to consider access and capacity improvements. This includes working with the London Legacy Development Corporation on reviving proposals for a new entrance and ticket hall to serve the Carpenters Road area, and on improvements to step-free access and capacity in the adjacent western subway.



We are creating more retail units in our railway arches

Track renewals

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
Annual	89	122	132* ▲	0

2019/20 strategic milestone RAG On Track

We are replacing our ballasted and deep Tube track, points and crossings, and track drainage infrastructure to improve reliability, reduce maintenance costs and increase capacity.

We replaced 1.8km of ballasted track in Quarter 3 2019/20 and more than 1.1km of drainage.

On our deep Tube track network, we replaced 1.4km of an older track with modern flat bottom rails and renewed a further 0.9km of concreted deep Tube track.

The track renewals programme achieved a key milestone in September 2019 by installing 3.4km of new ballasted track.

During Quarter 3, we directly installed two points and crossings on the Piccadilly line at South Harrow.

Accessibility

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24	58	176	176 ▲	0

2019/20 strategic milestone RAG On Track

We are working on a wide programme of accessibility improvements, customer service and information enhancements across the Underground network. We will make more than one-third of stations accessible in 2020.

We are making 15 stations accessible as part of the first phase of the Mayor's step-free programme. We delivered step-free access at three stations in 2018/19.

The remaining 12 step-free projects, at Amersham, Burnt Oak, Cockfosters, Debden, Hanger Lane, Harrow-on-the-Hill, Ickenham, Mill Hill East, Northolt, Osterley, Sudbury Hill and Wimbledon Park, are all on-site. These projects include the construction of new lifts and bridges, while other assets will be upgraded as we carry out these works.

We have completed piling work to prepare the foundations at Amersham, Osterley and Ickenham. At Amersham, the lift towers and overbridges are in, ready for the lift installation to start in February. At Debden and Harrow-on-the-Hill, piling and ground works is in preparation for a lift tower, and overbridge installation continues.

Works are ongoing to prepare for piling at the three remaining sites, including Burnt Oak, Hanger Lane and Northolt.

Mill Hill East lift has entered its final testing and commissioning phase to ensure reliability when it enters service. Lift installation has commenced at Cockfosters.

* Track EFC is based on an annualised programme. Spend to date and EFC are based on the forecast for P9 2019/20

Power, cooling and energy

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24*	49	90	88	0

2019/20 strategic milestone RAG On Track

Our renewals programme aims to improve safety, reliability and legal compliance of our power assets, introduce cooling in key locations to improve the customer experience and increase the energy efficiency of our assets.

Power

We continue to support a number of third-party and major projects by providing power works, such as relocating the substation at Euston station for HS2, installing cable routes for the Northern Line Extension, and works for the Piccadilly line and Bank station upgrades.

We are delivering a rolling portfolio of power renewal works to improve the condition of assets through a prioritised work bank of projects. Installation work on the first of these safety related projects has been completed, with several others now in delivery. Designs for the next priorities have been completed and they are moving into procurement. Key objectives and forthcoming milestones include projects to replace depot traction isolation and high voltage network switchgear, plus station emergency lighting power supply equipment.

We have completed the testing of new specialist equipment at Greenwich Power Station, which protects the Four Lines Modernisation network's resilience by improving the quality of the power supply, and was commissioned into service at the end of 2019.

We are in the advanced stages of procurement for a project to extend the life of the main power control system to address obsolescence risks and consolidate three power control systems to a single one. Once completed, this system will remotely monitor and safely operate traction, station, signalling and depot power supplies on all lines.

Cooling

In August 2019, we completed works at Bond Street station to provide improved airflow to the new Elizabeth line tunnel. We continue to upgrade the cooling of our power assets to support the new Four Lines Modernisation signalling system.

Energy

We are reducing our environmental impact by installing new solar panels on selected London Underground, DLR and tram depots to deliver more than 1.1 megawatts of power.

In early February 2020 the first solar panels were installed on the roof of the Tunnelling Underground Construction Academy. This milestone marks the start of the installation of solar panels across our estate to deliver 1.1MWp of solar generated, zero-carbon electricity, supporting the Mayor's London Environment Strategy and Solar Action Plan.

The panels have not been commissioned and are currently not generating any electricity. The installation was the first step to meet the long-term ambition of producing 1.1MWp across three sites.

* The figures represent power and energy projects until 2023/24 and authority is sought in stages for future unapproved works.

Rolling stock renewals

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24	209	525*	970	0

2019/20 strategic milestone RAG

We are modifying our passenger rolling stock to improve safety, accessibility, reliability and customer satisfaction, as well as to reduce maintenance costs. We are also modifying or replacing some of our existing engineering vehicles that support track maintenance and infrastructure renewals.

We are carrying out improvements to ensure continued reliability of the Bakerloo line fleet. We have completed structural weld repairs to carriages on all 36 trains. We have also refitted the vinyl on all trains to make them consistent with newer trains.

On the Jubilee line, all 63 trains have been refurbished and are back in service. The refurbishments include a wheelchair area, new flooring, refreshed exterior and interior, including grab-poles and handles, and new sealing to the roof and windows. We have also started to install the new priority seating moquette. The fleet is now compliant with the Rail Vehicle Accessibility Regulations.

On the Central line improvement programme, we are creating prototypes for four carriages at the AC Traction supplier's site. We have started dynamic testing of the train management system on a second prototype train at London Underground premises.

We continue to work with our supply chain to enable the installation facilities for the improvement programme on the full fleet. Work to integrate overhaul activities and modification activities has started.

Construction work continues on a new facility to support the Train Modification Unit at Acton. The external cladding of the building is nearly complete and the pit roads are being built. Construction work on the first phase of the new track layout is complete and being checked prior to handover.

The first seven pre-production engineering vehicles in China are being prepared for static testing. Once complete, they make a two-month journey by sea to the UK, where they undergo infrastructure and dynamic testing. After the pre-production wagons are fully tested and approved, the remaining 66 wagons will be manufactured in China by CRRC (the world's largest rolling stock manufacturer).

The two Kirow cranes and eight tilting wagons arrived at Ruislip Depot in November following a 1,400km journey by rail through Germany, France, and the Channel Tunnel into the UK. The machines are being prepared for infrastructure testing, due to start in early 2020.

The mechanised renewals vehicle will improve the way track is renewed in the deep Tube sections of the Bakerloo, Central, Jubilee, Northern, Piccadilly and Victoria lines. The three allocated wagons are being overhauled, which is due to finish in early 2020. The wagons will then be hauled back to Ruislip Depot ready for fitment of the track renewal equipment and are due to be in service by June 2020.

Ruislip Depot is being upgraded to enable the vehicles to be stabled and loaded. In November, the train loading bay within Ruislip Depot took delivery of the Kirow crane lifting beams along with the cross and connector beams that enable the tilting wagons to operate.

Following an option selection evaluation exercise, we have started creating the tender documentation for replacing our track recording vehicle, which records and monitors the alignment and condition of the track, supporting track maintenance and renewal activities. An ingenious solution has also been agreed to ensure the vehicle can operate on sub-surface lines following the new signalling roll-out. This mitigation and the 750V modification will be complete in summer 2020.

The project to give train operators better control over unauthorised entry into the cab from the saloon is progressing well. The contract has been awarded and installation support is being finalised, with the first installation due on the Waterloo & City line in early 2020.

* The authority is lower than the EFC as authority is sought in stages.



Our signalling and control assets support the running of our services

Signalling and control

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24	83	145*	180	0

2019/20 strategic milestone RAG On Track

We are extending the life of our track-based signalling and control assets. This ensures they can continue to support a safe, reliable and maintainable service until then.

Siemens is continuing the design for the life extension of the Central line signalling and control systems. This project will maintain the reliability, availability, maintainability and safety of the signalling assets and resolve obsolescence concerns. Once the design of a number of items has been finalised, we will work with Siemens to deliver pilot sites and complete trials.

Works to replace the signalling system in Northumberland Park Depot on the Victoria line has started. This is required to interface with the new depot control system. A contract has been awarded for the design phase and is progressing according to plan.

We have finalised commissioning of all the new Piccadilly line signalling control systems at the control centre in west London. The migration of control has progressed well and is now complete. This project planned is planned to be completed in the first quarter of 2020.

* Authority updated for latest PIC paper

Surface

Healthy Streets

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2021/22	558	1,207

2019/20 strategic milestone RAG On Track

The Healthy Streets Approach prioritises health and wellbeing, with the overall objective of creating a transport system where everyone can travel safely by the healthiest and most resource-efficient means, specifically walking, cycling and public transport. It is central to achieving the 80 per cent mode share target in the Mayor’s Transport Strategy.

Highbury Corner gyratory

The main highway and urban realm work is now complete. The road network has been reconfigured and the gyratory at Highbury Corner removed. In November 2019, new trees were planted and hostile vehicle measures were installed. Further hostile vehicle measures will be installed outside Highbury & Islington station this year once approval has been obtained from Network Rail. The Mayor officially opened the scheme on 2 October 2019.

Wandsworth gyratory

The purchase of properties from landowners on Putney Bridge Road is progressing, with the remaining three properties expected to be acquired by April 2020. The concept design will be completed by the end of February 2020, ready for inclusion in the tender package. The scheme will now be tendered through the civils project framework contract, and tender documents are currently being prepared. The detailed design remains on track to run in parallel with the compulsory purchase order (CPO) process. We plan to start construction at the end of 2021.

EFC (£m)	EFC movement post plan (£m)
1,207 ▼▼	(258)

The EFC covers 2021/22 to provide a direct comparison to the programme as originally approved in 2017/18. In June 2019, we announced our intention for the Rotherhithe to Canary Wharf crossing project to return to feasibility stage, and we are reviewing options to deliver a ferry crossing. This is reflected in the change to EFC. We are still planning for the same historic level of Healthy Streets projects.

Fiveways

The project aims to alleviate congestion and improve journey times at Fiveways Corner in Croydon. Work is continuing to update the business case and ensure the project remains aligned to the latest developments within the Croydon Growth Zone. We are preparing a planning application and a tender for a design and build contract to be let, both during 2020. CPO approval will be sought at the TfL Board in the spring, and the CPO process will run in parallel with the detailed design in 2021.

Vauxhall Cross

This project has been paused since the interfacing developer’s planning application was called in by the Secretary of State for Housing, Communities and Local Government in May 2019. Following the inspector’s report, which is expected in early 2020, the Secretary of State’s decision is anticipated in summer 2020. We will not be going out to tender for the design and build contract until we have a positive outcome from the planning decision.

King’s Cross

Safety, cycling and pedestrian improvements are being delivered in phases in the King’s Cross and Euston Road area. The first phase is to improve safety at the Duke’s Road and Churchway junction on Euston Road, which started construction in December 2019. Proposals include a ‘green man’ pedestrian crossing across both Churchway and Duke’s Road and provision of safer north-south movements for cyclists.

Waterloo City Hub

The scheme provides significant safety and comfort upgrades for pedestrians, cyclists and public transport users. The scheme will provide a new pedestrian walking route to the river, improved road crossings, segregated cycling facilities and improved bus waiting and boarding areas. The detailed design continues to progress well. We aim to start construction in summer 2020, subject to securing the necessary consents. We continue to work closely with the London Borough of Lambeth and developers in the area to ensure delivery is coordinated with existing and future plans for Waterloo.

Old Street Roundabout

Construction is progressing at Old Street roundabout, where a new design will improve safety 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 the Underground station and shopping arcade.

Following the temporary traffic switch in May 2019, which closed the southeast arm of the roundabout, construction work continues on the new entrance to Old Street Underground station near Cowper Street, which will be complete in spring 2020. Utility diversions have all been completed, including a difficult and complex diversion of a 24 inch-high pressure water main by Thames Water. This was completed in November 2019, but unfortunately took longer to complete than previously scheduled and has impacted overall delivery of the project.

Other associated highways and drainage works in the southeast arm of the roundabout have progressed.

Site clearance and station roof strengthening works have started within the roundabout peninsula, and a temporary goods lift for the shopping arcade area has been installed. This enables the existing goods lift to be removed in readiness for demolition works for the new main entrance to Old Street Underground station, which began in January 2020.

In spring 2020, a second temporary traffic switch will take place to reopen the southeast arm of the roundabout and close the northeast arm. This will enable the station roof strengthening works to be completed and the opening in the peninsula to be created for the superstructure elements for the new main station entrance. In summer 2020, a final traffic management switch will take place to reopen the northeast arm of the roundabout and permanently close the northwest arm. This will enable the construction of the public space, new passenger lift and new main station entrance in the peninsula area.

Construction is now expected to be complete by autumn 2021. This is due to delays to utility diversions as well as preparing new designs for the main entrance to Old Street station and an extra lift.

Lambeth Bridge north and south

This scheme will improve safety and comfort for pedestrians and cyclists, by removing the current roundabouts on both sides of the river and replacing them with signal controlled junctions. The proposal includes segregated approaches for cyclists with dedicated cycle phases at the junction and new signal controlled pedestrian crossing facilities. The shared space has been reviewed with small changes being introduced to separate pedestrians and cyclists where possible. Survey and design continues to detail the work required to replace the waterproofing, drainage and expansion joints on the bridge deck. We have concluded our discussions with key stakeholders about their responses to the 2017 public consultation. The design amendments and proposed way forward will be published in spring 2020 as part of the consultation report.

Cycleways

We continue to make good progress on the development of the wider Cycleway network, with a focus on completing and opening whole or significant sections of these routes. We have constructed more than 140km of cycle routes since 2016, with more than five kilometres of additional routes under construction through inner and outer London. All newly completed routes will be signed as Cycleways.

Design works are progressing well to rebrand existing high-quality cycling routes to Cycleways, with 50 per cent of the designs finished at the end of December 2019. CS6 has been rebranded with C6 signs, and the route now extends from Elephant



We have constructed more than 140km of cycle routes since 2016

and Castle to Kentish Town. The rebranding of C28 along Portsmouth Road in Kingston also started in December 2019, which is forecast to be completed by the end of March 2020.

Improvements between Wood Lane and Acton (Cycleway 34)

The works are progressing well to deliver 3.5km of upgraded shared-use facility for pedestrians and cyclists and a new off carriageway bi-directional cycle track along the A40 between Wood Lane and Acton.

Works to install the new cycle track and footway are complete between Savoy Circus and Gibbon Road. These are progressing well between Leamington Park and Kathleen Avenue, including installation of new signalised cycle crossings at junctions. Upgrades to the existing shared-use facility between Wood Lane and Savoy Circus are now complete and work has started to improve pedestrian and cycle crossings at Savoy Circus.

Proposed improvements between Wood Lane and Notting Hill Gate

The consultation report for the proposed improvements between Wood Lane and Notting Hill Gate was published on 5 November 2019. We continue to work with the London Borough of Hammersmith & Fulham to finalise plans for its section of the route, while developing improvements for the section in the Royal Borough of Kensington and Chelsea to address concerns raised during the consultation. We are engaging with the borough and key local stakeholder groups to discuss the changes.

Cycleway 4

Construction for Cycleway 4 is progressing well at the two sections of Jamaica Road and Rotherhithe Roundabout and is on track to be completed by May 2020. New traffic signals at Tooley Street at its junction with Tower Bridge Road were successfully commissioned in November 2019 and following this, we opened up sections of the new cycle track in December 2019. Construction of a further section along Creek Road within the Royal Borough of Greenwich started in November 2019, which was ahead of schedule.

Cycleway 9

Detailed design for the Kew Bridge section was completed in September 2019. London Borough of Hounslow's Cabinet approved the scheme within the borough in September 2019. The London Borough of Hammersmith & Fulham Cabinet approved to construct the scheme within its borough in December 2019 and work began on Kew Bridge in December 2019.

Cycleway between Hackney and the Isle of Dogs

We ran a public consultation for this route between 8 May and 21 June 2019, with results published in October 2019. Detailed design for the first section of Burdett Road has been completed ahead of the start of construction planned for April 2020. Advanced works for the scheme started in December 2019, including the relocation of a cycle hire station and CCTV cabinets, removal of street clutter and drainage repair works. We are continuing to meet regularly with Tower Hamlets Council to coordinate the start of works on Burdett

Road and the design of the Grove Road proposals with its proposed Liveable Neighbourhood scheme in the same area.

The northern section of the route is being delivered by the London Borough of Hackney, which is now reviewing the concept design.

The Isle of Dogs section has now been de-scoped from the main project as proposals do not meet the Cycling Quality Criteria. Improvements in the Isle of Dogs will be progressed as part of the Cycleway network development with the help of Tower Hamlets Council.

Future Cycleway routes

Design work continues on several major new cycle routes identified in the 2017 Strategic Cycling Analysis. In addition to the public consultation for the first route between Hackney and the Isle of Dogs, other public consultations that have recently closed include the proposed Cycleway between Ilford and Barking Riverside, and the Cycleway between Lea Bridge and Dalston, the second phase of which finished consultation in mid-December 2019. At the beginning of January 2020, we launched a public consultation for a Cycleway between Woolwich and Charlton, which is the first phase of the whole route that will extend to Woolwich.

Cycleway between Camden and Tottenham Hale

We are continuing design and modelling assessments for this proposed route. This review has enabled us to further refine the proposals and to engage with key

stakeholders including the relevant local councils. These activities aim to ensure the scheme that goes to public consultation in 2020 is the best that can be achieved for the local communities and road users along this route and surrounding areas.

Mini-Hollands and Cycleway network development

The Mini-Hollands programme involves both infrastructure and behaviour change schemes across three outer London boroughs – Waltham Forest, Enfield and Kingston. Good progress is being made by all three boroughs, each having completed Cycleway routes including the recently launched Lea Bridge Road, a five-kilometre protected cycle route linking Millfields Park to Whipps Cross, offering improvements to both pedestrians and cyclists. Schemes currently under construction include protected Cycleways between Kingston Vale and Kingston, and Kingston and Surbiton in the Royal Borough of Kingston, and between Ponders End and Freezey Water on the A1010 in Enfield.

Further schemes are progressing through design and consultation, including a number of Cycleway links and Enfield's Quieter Neighbourhoods.

Waltham Forest will complete its Mini-Hollands funded programme at the end of this financial year.

Rotherhithe to Canary Wharf crossing

We are investigating the feasibility of providing a new pedestrian and cycling ferry crossing between Rotherhithe and Canary Wharf to improve cross-river



We are installing 20mph signage across London

connectivity and drive access and growth in the area. Our feasibility and options analysis is nearly complete, which looks at our preferred pier locations, ferry type, and delivery and operating model. These activities will better inform our forward programme ahead of starting work on concept design, procurement preparation, and planning and consents preparation in early 2020, with the view to starting a procurement exercise in summer 2020.

Safer Junctions

In April 2017, the Safer Junctions programme highlighted some of the most dangerous junctions on our road network. These are defined as those with the highest vulnerable road user collision rates between 2013 and 2015. Following substantial completion of Highbury Corner in September 2019, we have now constructed 31 of these Safer Junctions and have introduced mitigations measures to all of them to reduce road danger.

Construction of Camberwell town centre Safer Junction began in October 2019, and work continues on the Rotherhithe Tunnel junction as part of Cycleway 4. The programme is on target to complete 41 junctions by May 2020, in line with the Mayor's Vision Zero commitment. Public consultation reports have been published on the following accelerated Safer Junctions projects:

- Kingsland Road/Balls Pond Road
- Kennington Park Road/Braganza Street
- East India Dock Road/Birchfield Street

- Edgware Road/Harrow Road
- Clapham Road/Union Road
- Holloway Road/Drayton Park/Palmer Place
- Camden Street/Camden Road

The Traffic Regulation Orders for the changes are being advertised to the public, to ensure that proposed speed limit changes and prohibited movements are legally enforceable. The detailed design packages have been finalised and construction began in January 2020.

Lowering speed limits

The consultation report for introducing 20mph speed limits in central London has now been published, and detailed design is nearly complete. The Traffic Regulation Orders have also been published for consultation, which are needed to ensure the new speed limit is legally enforceable.

Implementation of the first phase of the central London 20mph speed limit, installing 20mph signs and carriageway markings, started in November 2019 and is substantially complete. Detailed design work is complete on the second phase of the project, to install seven raised traffic calming features on the TfL Road Network.

The 20mph speed limit in central London will be launched by the end of March 2020. Behaviour change marketing communications will take place ahead of the launch to ensure drivers are aware of the new speed limit.

Direct Vision Standard

The Direct Vision Standard (DVS) was created to improve the safety of all road users, particularly the most vulnerable, such as pedestrians, cyclists and motorcyclists, by assessing vehicle blind spots. The DVS assesses and rates how much a driver can see directly from their heavy goods vehicle (HGV) cab in relation to other road users and assigns a star rating from zero (poor) to five (excellent). Any vehicle rated zero star will be required to fit additional safety equipment to increase the vehicle's safety to meet the minimum one-star requirement. Upon application, a HGV Safety Permit, recording the vehicle's star rating or safe system, is then issued.

Under the DVS scheme, all HGVs weighing more than 12 tonnes will be required to hold a Safety Permit in order to operate in the Greater London area from October 2020. The minimum DVS threshold will rise to three stars from October 2024 to ensure we continually improve the safety of HGVs coming into London.

The registration element, enabling operators to apply for an HGV Safety Permit online, was successfully launched on 28 October 2019. This gives operators a year to prepare and apply for a permit ahead of the October 2020 enforcement date. Work has commenced on core system development and testing to prepare for the launch of the enforcement element of the scheme in October 2020.

Crossrail complementary measures

We are working with the boroughs, Crossrail Ltd and Network Rail to develop and deliver a programme of improvements to 17 stations in outer London, to improve capacity and help regenerate local communities. So far, Crossrail complementary measures works are complete at Abbey Wood, Chadwell Heath, Goodmayes, Manor Park and Romford stations. Site works at Forest Gate, Gidea Park, Hanwell, Harold Wood, Ilford, Maryland, Seven Kings, Acton Main Line, West Ealing and West Drayton stations are at various stages of construction. Southall and West Ealing stations are at design or consultation stage.

The original Crossrail programme has slipped and a new programme is being developed for station works. Complementary works at some stations are dependent on station works as well as borough delivery.

Liveable Neighbourhoods

Liveable Neighbourhoods are a key part of how we work with boroughs to deliver the Mayor's Transport Strategy, by creating locally led, attractive, healthy and safe neighbourhoods that encourage walking, cycling and public transport use and reduce car journeys.

Progress continues on the current 18 Liveable Neighbourhood projects. Public consultation started on the Deptford Parks

Liveable Neighbourhood in the London Borough of Lewisham in November 2019. Also, in November 2019 and as part of the third bidding round, we received 19 new bids from the following boroughs:

- Beacontree, Barking and Dagenham
- Erith Links, Bexley
- Park Royal, Brent
- Ealing town centre, Ealing
- Angel Edmonton, Enfield
- North Fulham, Hammersmith & Fulham
- Tottenham, Haringey
- Wealdstone, Harrow
- Ruislip, Hillingdon
- Feltham, Hounslow
- Farringdon and Old Street, Islington
- Connecting Malden Manor, Kingston
- Leyton, Newham
- Barnes, Richmond
- North Kingston/Ham and Petersham, Richmond

- Sutton, Sutton
- Brick Lane, Tower Hamlets
- Higham Hill and Lloyd Park, Waltham Forest
- Thamesfield West, Wandsworth

These bids will be assessed over the next few months and we intend to announce the winning bids in March 2020.

Borough Local Implementation Plan projects

Blackhorse Road/Forest Road

The London Borough of Waltham Forest commenced construction in June 2019, and it is on schedule to complete improvements to this junction as well as the area outside the Underground station by June 2020.

West End Project

The London Borough of Camden has completed most of the works on Tottenham Court Road, which is now operating two-way (buses and cyclists only southbound). Works are currently on-site at Gower Street/Bloomsbury Street and are scheduled to finish by summer 2020.

Feltham town centre

The London Borough of Hounslow and Network Rail works are well underway. The phases funded through the Local Implementation Plan major schemes budget are now forecast to be completed by March 2020, but delays have been encountered which are impacting Network Rail funded elements beyond this date.

Camberwell town centre

This overall scheme is being delivered in two elements. First, the London Borough of Southwark has completed improvements to Denmark Hill in summer 2019, including footway and carriageway renewal, a modification at the Orpheus Street junction, a new controlled pedestrian crossing at Love Walk, and a relocated pedestrian crossing by the Butterfly Walk shopping centre. These are all on Borough Strategic Road Network roads.

Second, we started works on the A202 corridor through the town centre in November 2019, including the Camberwell Green junction to improve vulnerable road user safety and provision, and develop the urban realm. This also forms part of our Safer Junctions programme. These works are funded via Local Implementation Projects major schemes and scheduled for completion in spring 2020.



Work continues to improve the area around Blackhorse Road

Air quality

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2022/23	219	280

2019/20 strategic milestone RAG On Track

The Air Quality programme reduces the impact of transport on air quality and climate change by targeting vehicles in our contracted and regulated fleets, and all vehicles driving in London.

Ultra Low Emission Zone

The Ultra Low Emission Zone (ULEZ) expansion project will extend the central London ULEZ, which was successfully introduced in April 2019, up to the North and South Circular Roads. The project is now in design phase with work ongoing to define the system, infrastructure and operational changes required and progress the supply chain commercial agreements.

The strategy and proof of concept phase for migrating existing systems from physical infrastructure to a cloud service to manage ULEZ expansion volumes was completed in January 2020. Detailed design for the cloud service and migration is due to be completed in May 2020.

Survey work to support camera and the signage infrastructure work streams has started. Signage designs have been completed and submitted to the DfT for approval. The first phase of modelling the traffic effects has been completed and engagement with affected boroughs is underway. Work continues to develop marketing and communications plans.

EFC (£m)	EFC movement post plan (£m)
503	0

The EFC reflects the financial authority up to 2022/23. The EFC is in line with prior submission and reflects the spend authority to the end of 2022/23.

Low Emission Zone 2020

The existing Low Emission Zone (LEZ) standards will be tightened from October 2020. The emissions standards for lorries, vans and other specialist heavy vehicles more than 3.5 tonnes, as well as buses, minibuses and coaches more than five tonnes, will change from Euro IV to Euro VI. Owners of vehicles that do not meet the tougher emissions standards will need to pay a daily charge to drive within the LEZ. To ensure a successful launch, the business and enforcement systems, as well as the website, need updating. These process changes will be supported by a comprehensive communications campaign.

A joint marketing campaign for both LEZ 2020 and the HGV Safety Permit scheme was launched in October 2019, supported by a vehicle registration checker webpage, targeted at HGV drivers. We are updating the website, and developing and testing the business and enforcement operations system required for October 2020.

Fleet compliance

To help meet the Mayor's air quality objectives in 2020, we are upgrading the entire bus fleet to meet Euro VI emissions. This includes retrofits of up to 4,000 midlife buses, of which 3,600 have already been completed.

In addition, all 12 Low Emission Bus Zones have been delivered one year earlier than planned. The zones are:

- Putney High Street
- Brixton to Streatham
- A2 Camberwell to New Cross
- A3 Wandsworth to St. John's Hill
- High Road, Haringey to Green Lanes
- A12 Eastern Avenue to Homerton Road
- A5 Edgware Road, Kilburn to Maida Vale
- A21 Lewisham to Catford
- Edmonton to Seven Sisters corridor
- Stratford
- Chiswick High Road to Kensington
- Uxbridge Road to Shepherds Bush

Ultra-low emission vehicles – rapid charging infrastructure

To support the growing number of zero-emission capable (ZEC) taxis and the wider take-up of electric vehicles, we are spending £18m and working with the London boroughs and other organisations to build a network of rapid charge points across London. Under this scheme, the number of charge points reached 200 in September 2019 and 225 in December 2019. This is a major step towards our target of 300 rapid charge points by December 2020.



There are more than 2,500 ZEC taxis licensed in London. Of the rapid charge points installed under this scheme, 73 are dedicated to taxi use. We are working with the taxi trade to identify the most favourable locations and focusing on the central London area for taxi-dedicated sites.

London's first rapid hub launched in Stratford on 28 December 2019, with grant funding for TfL. We are also developing designs for two more hub sites, one in Greenwich and another in the City of London, and working with other potential partners developing hub site proposals. These hubs will consist of at least six rapid charge points that can be used simultaneously to support both taxi and private electric vehicle users.

Mayor's Air Quality Fund

The Mayor's Air Quality Fund will invest £22m over 10 years to support projects by London boroughs to improve air quality. Projects supported in the third round of funding were announced by the Mayor on 7 June 2019. In this round he is supporting four Low Emission Neighbourhoods and two other innovative air quality projects.

Go Ultra Low City Scheme

Between 2015/16 and 2019/20, London's Go Ultra Low City Scheme bid was awarded £13m in capital funding to drive the uptake of ultra-low emission vehicles. We are working alongside London Councils and the GLA to install around 1,700 residential charging points. The allocation for the final round of funding is due to be announced, and we will support the boroughs in delivering these projects in 2020.

Asset investment

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2021/22	277	303

2019/20 strategic milestone RAG On Track

We replace, refurbish or reconstruct our surface assets to keep them in a safe condition through prioritised and planned works. This programme maintains and lengthens the working life of a wide range of assets, including carriageway, footway, lighting, drainage, bridges, tunnels, traffic signals, bus stations and river assets.

Ardleigh Green Bridge replacement

The bridge is now complete and fully open. The remaining railway-side work to remove remnants of the old bridge have been discussed with Network Rail. This is planned for completion by December 2020 when a suitable railway possession is available.

Bus driver facilities

Good progress has been made since the Mayor announced increased funding for bus driver facilities in February 2018. By 7 December 2019, we had delivered 19 permanent facilities and 26 temporary facilities against a minimum target of servicing 42 priority bus routes.

We are working towards the final target of having permanent facilities on all 42 priority bus routes by the end of March 2020 by connecting the remaining temporary units to the utilities including foul sewer, water and power supply, and constructing permanent concrete foundations. Where possible, we are adapting existing infrastructure to ensure it integrates well with the local environment.

EFC (£m)	EFC movement post plan (£m)
596 ▼▼	(38)

The EFC covers 2021/22 to provide a direct comparison to the programme as originally approved in 2017/18. The majority of this relates to Rotherhithe Tunnel, where more advanced investigation on the timing of major works has moved spend from 2021/22 to 2022/23.

To save costs, we plan to use an internal rather than external technology supplier to renew our Strategic Asset Management Information Systems.

Hammersmith Bridge

Recognising the impact the closure of this strategic route is having on residents and bus operations, we have quickly completed an options analysis with high-level costs and benefits on behalf of the London Borough of Hammersmith & Fulham which owns the bridge.

It has now confirmed its intention to restore the bridge with a 7.5 tonne limit for general traffic, together with future proofing for limited electric buses. We have committed £25m to the project and are progressing with the concept design phase, together with advanced works. In August 2019, the concept design work for the bridge was awarded to Pell Frischmann and it is expected to be completed by the end of March 2020.

We are using all our tools to measure, understand and mitigate the effect of the closure on traffic. This includes using our network data to make decisions on traffic light timings and implement contingency plans to manage unplanned events. For example, we have completed a significant redesign of timings around Hogarth Roundabout, a comprehensive change to timings around Hammersmith, and rebalanced priorities at Chalkers Corner and Lower Richmond Road. Journey times are showing some improvement as a result of these traffic light changes.

Rotherhithe Tunnel

Rotherhithe Tunnel, opened in 1908, is a single-bore road tunnel carrying the A101 beneath the River Thames in east London. Planned Rotherhithe Tunnel refurbishment works include renewing tunnel lighting and cable supports, replacing the fire main system, providing resilient power supply, upgrading and reconfiguring the ventilation system, as well as other mechanical, electrical and civil assets that are life-expired or safety-critical.

Concept design for the refurbishment of Rotherhithe Tunnel is due to be completed in summer 2020. A separate workstream to install additional protective measures at the tunnel entrances and prevent excess height vehicles entering the tunnel has started and is planned to be operational by summer 2020.

We made enforcement of vital safety restrictions in the Rotherhithe Tunnel stricter from December 2019 to stop vehicles that are more than two metres wide or two metres high, or goods vehicles weighing more than two tonnes, from endangering other road users by entering the tunnel. From 2 December 2019, non-compliant vehicles entering the tunnel could now receive a Penalty Charge Notice for each journey through the tunnel, rather than one per day.

Public transport

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2021/22	261	347

2019/20 strategic milestone RAG 

The public transport programme oversees London Buses, London Overground, the DLR, London Trams, Emirates Air Line, Santander Cycles and London River Services.

London Overground

At West Hampstead, two new lifts have been brought into use, making the station fully accessible. The final work on the platforms has been completed, which has increased the size and relieved congestion during peak times. We have been operating a 10 trains per hour (tph) peak service on the North London line since December of last year.

We are progressing with a design for updated signalling to enable 18 trains per hour to run in east London. The works are planned to be implemented in summer 2020 ahead of the timetable change, which takes place in December.

We were successful in a bid to attain Housing Infrastructure Fund money to carry out infrastructure changes in east London to accommodate several housing developments in the Surrey Quays area. The schemes delivered as part of this bid are a redevelopment of Surrey Quays station, a new station at Surrey Canal Road and infrastructure changes to enable 20 trains per hour to run. An agreement is being negotiated with Homes England and will be signed by April 2020 to enable the project team to develop the designs.

EFC (£m)	EFC movement post plan (£m)
482	(10)

The increased EFC reflects increased spend on critical renewals across trams, London Overground and the DLR. To be noted, all projects are now reported at gross value. The increased EFC spend authority is to the end of 2021/22.

DLR

A number of new projects have started in the last quarter, including Limehouse arch repair, track renewals, noise mitigation, track access, depot conductor rail renewal and Woolwich Arsenal waterproofing.

High voltage equipment for Poplar Depot has been built and tested off site and a high voltage system commissioned for Stratford. The contractor is on site and surveying a number of stations to install additional Oyster validators.

Poplar station continues to be upgraded with new LED lights, cabling and containment works, which are progressing well. The upgrade of DLR engineering vehicle CT30 has been delivered to Beckton Depot for track testing, which is planned to begin in March 2020 and continue until June 2020. Handover is planned for August 2020.

Work to upgrade the entire signalling system to improve resilience is making progress, with a planned software upgrade scheduled for this quarter.

Design approval for the visitors' centre at London City Airport is expected in early 2020, which will enable the start of construction in March 2020.

The capacity upgrade work at Custom House station is ongoing while the station remains operational.

London Trams

As part of our commitment to making the tram network safer following the tragedy at Sandilands in 2016, we continue to address the recommendations from the Rail Accident Investigation Branch. We have completed several initiatives and are currently in the final delivery phases of the physical prevention of over-speeding automatic braking system with an enhanced lighting for the Sandilands tunnel. Work has commenced to fit a new emergency lighting system to all trams.

Our renewals programme of works continues across seven asset groups including fleet, power, civils, systems and permanent way infrastructure.

Key highlights this quarter include the substantial completion of highway reconstruction works for the Blackhorse Lane Bridges Replacement project, with a single-lane opening on 9 December. The full re-opening will follow in March 2020. Waterproofing works on another of our road bridges, Addiscombe Road Bridge, was also completed.

Overhaul of the Bombardier CR4000 bogies has continued to progress well, with only two units remaining. The contract to replace the switchgear system at Oaks Road substation was awarded and the procurement of a contractor for the depot power rebalancing works is currently in its final stages.



The Systems Integration Project, related to network-wide telecommunications upgrades and obsolescence management, continues to progress well. Commissioning works are on schedule to be completed by the end of 2020.

A revised programme and cost estimate has been agreed with Network Rail for completing outstanding works at Wimbledon platform 10. The replacement of bins and poster-frames across all tram stops was completed as part of the customer experience project, and liaison has progressed with South Western Railway on the removal of the last redundant ticket vending machine from Wimbledon station.

Key milestones achieved after quarter close were the re-opening of Blackhorse Lane to single-lane traffic on 9 December and the completion of commissioning works for the Systems Integration Project on 8 December 2019.

Surface technology

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2023/24	6	85

2019/20 strategic milestone RAG 

This programme is responsible for overseeing strategically important technology projects within our five-year Business Plan. It provides a structure for all future technology projects being delivered by Surface Transport.

Surface intelligent transport systems

We are leading the way in delivering innovative new road traffic management systems to make journeys on foot, bike and bus, as well as essential emergency services and freight trips, as efficient as possible. We are working with Siemens to develop the Real Time Optimiser system. This will manage the flow of people on London's road network by controlling the phasing of traffic signals using pre-planned timetables, manual interventions and optimisation techniques. We are in discussion with Siemens about timescales to complete this work.

We are also working with Sopra Steria to design, develop and implement a new incident management system, enabling us to increase the speed at which we detect and respond to incidents on the road network. Work is progressing well, with the first few months of development delivering as planned.

Operational safety and compliance

We are developing a consolidated compliance and enforcement programme. As a result, we will support a more versatile compliance, policing and on-street services operation.

EFC (£m)	EFC movement post plan (£m)
159 ▼▼	(18)

The EFC reflects the financial authority, and the 2019 Programmes and Investment Committee authority, up to 2023/24. Surface technology is a new portfolio and their first paper was submitted to the Programmes and Investment Committee in March 2019. The spend authority is therefore below EFC as the portfolio is only part authorised.

This will help improve efficiencies and support safe, secure and reliable journeys. We are in the process of defining the project scope, with a view to confirming a delivery strategy next year. This programme includes proposals to introduce body worn cameras for more staff in front line roles, in line with operational need, and to introduce unattended deployable cameras to improve compliance with road traffic regulations.

This programme includes procuring systems and services to support our licensing of taxi and private hire vehicles, drivers and operators. We will ensure business continuity is maintained, protecting customers and ensuring vehicles are safe, accessible and meet strict environmental standards. The new system aims to provide an efficient service to taxi and private hire vehicle owners, drivers and operators. Following early market engagement, a Prior Information Notice was issued in September 2019.

Public transport technology


To support a good public transport experience, we are maintaining and developing technology to operate our public transport networks and improve customer experience. This includes upgrading the technology systems that underpin the bus network, providing better information systems and improving the booking system for Dial-a-Ride.

We are making good progress towards finalising tender documentation for the booking system for Dial-a-Ride, and are developing a procurement strategy to upgrade bus technology systems.

Other

Technology and Data

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2020/21	101	228

2019/20 strategic milestone RAG 

The Technology and Data programme provides the core infrastructure, services and technologies that enable us to achieve our strategic priorities.

Payments

In partnership with the DfT, we have extended pay as you go on contactless payment cards to six additional stations on Go-Ahead Thameslink Railway's network as far as Luton Airport Parkway and Welwyn Garden City. We have extended pay as you go to Reading in January 2020. In all these instances, pay as you go will offer customers a convenient alternative to single and return tickets, with automatic daily and weekly capping being introduced in spring 2020.

We take the protection of customer data very seriously. In 2019, some customer accounts were accessed maliciously by third parties using correct usernames and passwords obtained from other websites that had been compromised. We have since taken steps to improve the security of our Oyster Online and contactless account web pages. As part of the improved security, we have strengthened the password requirement for these accounts and have required every account holder to change their password. We will take further steps to protect customer data during 2020.

EFC (£m)	EFC movement post plan (£m)
195 ▼▼	33

Authority and EFC shown are for financial years 2018/19 to 2020/21. The main reason for the decrease in EFC is due to an overprogramming adjustment that was included in the 2019 Business Plan values to deal with slippage into future years. The total value for this adjustment in 2019/2020 and 2020/2021 is £39.7m.



We are working towards having 4G capability on the Tube

Evergreen programme

The Evergreen programme is aimed at renewing more than 80 per cent of our desktop PCs, and moving all users to Windows 10/Office 365 by the end of March 2020. By dealing with technology obsolescence we will significantly reduce the operational, security and financial risks of unsupported IT hardware and software.

The Smart Working programme is a key enabler for our accommodation strategy, and the resulting move to have seven desks for every 10 people in the main office buildings. The programme includes several technology enabler projects from digital workplace, such as providing around 1,700 new laptops for users who are changing their way of working to become more mobile and using IT tools to connect from any location. Excellent progress has been made on both these programmes.

Around 8,000 new 'thin client' PCs have been successfully deployed, with excellent user feedback. These are small, low-cost PCs found in most office neighbourhoods and community areas. They are shared devices available for all our account users to log-on and receive their desktop profile.

Content and collaboration

Microsoft SharePoint is one of our main departmental file sharing applications. However, three versions exist that need to be consolidated into a single version, SharePoint Online. To date, all SharePoint 2007 sites have been migrated, and 227 SharePoint 2010 sites have also been migrated with only eight remaining.

Livelihood is our document management tool, largely used for engineering documentation. The current version is not supported and needs to be upgraded to run under Windows 10. The project has completed a proof of concept to validate new infrastructure designs, and the build and installation of a new test environment. Current work is focused on the pre-production installation and upgrade.

The Intranet Consolidation/Renewal project is to replace the three current portals with a single new portal, based on Microsoft 365 software, with a new front end which makes it easier to search and customise. The project has completed the procurement phase.

Hosting – data centre rationalisation and cloud migration

Hosting continues to develop a hybrid operating model in which we have extended our data centre core capabilities into the public cloud through Amazon Web Services (AWS) and Azure. The expanded capabilities to deliver stronger governance, operational controls and cost transparency to yield additional efficiencies has been delivered in Azure and good progress is currently being made in AWS.

The first tranche of a new infrastructure technology was implemented in our data centre. This is part of the technology refresh project.

Data and analytics

Last quarter, we completed daily processing changes for contactless payment by ensuring that all of the refunds generated

are processed through the faster universal load. This means that customers can receive their refunds at any reader across the TfL network.

The Bus Speed Compliance Tool is now a supported live application, which will transform our capability to understand the extent of speeding infringements across our bus network. Our buses generate around 700 million log records across about 60,000 files every day and, until now, we had no way of bringing this data together in a way that highlights which routes, roads or vehicles are most prone to exceeding the speed limit. Driven primarily by the Mayor's Vision Zero strategy, the benefits include:

- Speeding up and reducing the cost of accident and complaint investigations
- Being able to identify particular roads where speeding is most prevalent to drive strategic infrastructure improvements
- Prioritising and assessing the success of Intelligent Speed Assistance installations across the bus network
- Helping to identify the need for further driver training
- Helping to drive a speed awareness culture across bus garages
- Identifying routes which may need to be rescheduled to allow drivers more time

Following the successful implementation of the solution to capture and analyse Wi-Fi connection data, the Journey Planner tool

has been updated with average walk-times between interchanges and platforms. This provides an accurate reflection of journey times across 55 stations. There will be further benefits in 2020, including analysing route choices and showing how busy a station is.

Networks

The delivery of the London Underground Connect radio system upgrade continues, with the new core site equipment now successfully integrated and running in parallel with the live system.

We continue to deliver infrastructure to support the Home Office's new national Emergency Service Network communications system. We have now installed 335km of tunnel fibre (80 per cent), pulled 376km of the tunnel leaky feeder (89 per cent) and fixed 181km of this leaky feeder (43 per cent) into its final position. Snagging works are underway at the next 14 stations (39 in total) and installation work has started in a further 15 stations. In parallel, we have now pulled leaky feeder into the eastern half of the Jubilee line, building on that already installed in the western section.

The design phase for the 4G pilot project has been completed and we have started installation work at all pilot sites and completed work in seven of the 16 tunnel bores. Initial infrastructure testing has started in the first tunnel bores and the learnings from those installations are being applied to all subsequent installations. Initial radio coverage testing began in December 2019.



We are upgrading the radio system on the Underground

Our project to secure a partner to commercialise our telecoms assets continues according to plan. We have completed our evaluation of the three bids and we are currently in dialogue with all bidders with the aim of issuing an invitation to submit final tender to all bidders by February 2020.

Technical refresh and technical service operation

Following the contract award to Computa Center to supply IT service desk functions, physical engineering support and hardware repair and build services, our preparations are underway. The project is on track and the primary tooling platform used to manage and resolve IT issues was upgraded in December 2019 as planned.

Enterprise resource planning

In November 2019, we delivered the new MyTfL employee recognition platform. This online system enables colleagues to recognise good work against our behaviours. Take up and feedback has been very positive.

In December 2019, we agreed a contract with Warwick International to deliver a new occupational health solution. The system efficiently manages the end-to-end process and experience for both our medical professionals and our people needing support. The new system is planned to go-live in September 2020.

We continue to support our finance teams, with the re-implementation of the SAP Business Planning and Consolidation system, which will make financial planning more efficient by using one central system. This system is live and being populated with data ready for full use by financial year end 2019/20.

Work continues to prepare the SAP platform for migration onto AWS, which will increase SAP performance, remove several technical support risks and put in place the necessary steps required for a full upgrade of SAP over the Business Plan. This is a significant enabler for our upgrade strategy over the next five years.

Following the successful Oracle Decommissioning project go-live in October 2019, post go-live issues have been minimal, with positive user feedback, and the project was completed at the end of December 2019.

Contact Centre operation

The contactless payment card outsourcing project has successfully completed the transition of contactless call handling to our supplier. Correspondence handling also commenced on the planned date of 9 December 2019. We are on track to complete the full transition of this service in early 2020.

Growth Fund

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2024/25	1.5	144	144	0

2019/20 strategic milestone RAG



This programme allocates funding to support transport schemes that help to unlock housing and commercial developments and support regeneration opportunities in some of London's key growth areas.

Existing Growth Fund schemes

The Growth Fund contributes to 15 existing schemes that will support more than 55,000 new homes and 30,000 new jobs. Recently completed schemes include the transformation of the northern roundabout at Elephant and Castle.

Significant progress has been made in upgrading and developing stations, such as Woolwich (Elizabeth line), Tottenham Hale and West Ham. White Hart Lane station reopened in late August 2019 and all these improvements support new housing developments. Our investment in the transport infrastructure has been supported by financial contributions from developers as well as other sources, including the GLA.

Sutton Link

We completed a detailed option selection process, including a public consultation on a shortlist of choices. Further work is now being progressed to develop the business case and funding package.

Committed schemes

We made recommendations to the Programmes and Investment Committee to provide contributions to support five schemes that met our agreed criteria.

These are:

- A new southern entrance at Ilford station to address capacity issues resulting from growth in the area, and to benefit bus passengers arriving at the station
- An upgrade at Colindale station in the first phase of a development programme to bring 10,000 new homes to the area
- An upgrade at Walthamstow Central station, with improved entrances and step-free access, to provide additional capacity to support new homes and jobs in Walthamstow town centre
- A new DLR station, Thames Wharf, to support the Thameside West development, which is set to deliver around 7,000 new homes

- An enhancement to Renwick Road, which will provide the additional capacity needed to unlock Barking Riverside development's delivery of around 7,000 new homes

We are working with the GLA to select the next set of projects to receive Growth Fund support and to seek funding for certain schemes through the Government's Housing Infrastructure Fund and Business Rates Retention Pilot scheme.



Elizabeth line

On-network stations improvement programme

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2020	86	94	95	0



This programme focuses on 22 existing stations, ensuring improved customer experience and step-free access, and a consistent station environment across the Elizabeth line.

Work on Great Eastern step-free schemes has been completed with lifts at Maryland, Manor Park and Seven Kings, in use since late February 2019. The handover of the assets from the contractor to Rail for London Infrastructure Limited (TfL's wholly owned infrastructure manager) is still outstanding due to issues with securing paperwork. While this paperwork is outstanding, the maintenance risk remains with the contractor, so it is hoped that this and outstanding payments will be sufficient incentive for the matter to be resolved in the coming weeks.

MTR Elizabeth Line is continuing its station refurbishment programme with work ongoing at Hanwell and about to start on site at Langley. The Langley scheme will refurbish the booking hall at the same time making space for ticket gates. The approach to the station from the south side will also be significantly improved at the same time, providing a better environment for customers as well creating a new southern station entrance with ticket barriers.

On the Great Western section, lift schemes at Hanwell, Iver, Langley and Taplow are entering the final phase. Taplow opened in December 2019 and Hanwell, Iver and Langley are expected in early 2020. This is ahead of the previously publicised spring 2020 date. The opening of the lifts will complement works at other stations by Crossrail and Network Rail, meaning the entire Paddington to Reading route will be step-free by the end of 2020. Network Rail works are now complete for the Harold Wood lifts, which were opened in January 2020.



Rolling stock

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2020	960	1,149	980	0

2019/20 strategic milestone RAG

We are introducing the new Elizabeth line train fleet in phases and have built a depot to provide train maintenance facilities.

Testing of the train and automatic train operation signalling has continued in the central section tunnels, including transitions to the Network Rail mainline routes to the east and west, as well as running multiple trains under the control of the system.

Signalling and train control software was installed on the trains and in the central section tunnels for testing through to February 2020, prompting the safety case and generation of the safety case for operating more trains at a higher frequency.

The project obtained approvals for operating Elizabeth line trains under the control of European Train Control System (ETCS) signalling on the Heathrow branch for driver training, and the submissions are now being made to the Office of Road and Rail pursuant to authorisation to operate the ETCS-fitted trains in Quarter 4.

Nine-carriage Elizabeth line trains have continued to operate limited services between Paddington and Hayes & Harlington while the software is upgraded. A fleet of seven-carriage Elizabeth line trains launched the all-day Reading to Paddington service on 15 December 2019. These will be replaced by nine-carriage trains when the software has been tested.



Crossrail

Forecast completion year	Spend to date (£m)	Spend authority (£bn)	EFC (£m)	EFC movement post plan (£m)
2022	*	17.6	*	*

2019/20 strategic milestone RAG

Crossrail Ltd's latest assessment is that the central section of the Elizabeth line will open in the summer of 2021. While this is disappointing, as joint sponsors with the DfT, we will work with Crossrail Ltd to ensure this project is delivered safely and as quickly as possible.

In January, Crossrail Ltd confirmed that it plans to open the central section that runs between Paddington and Abbey Wood in summer 2021.

Following the opening of the central section, full services across the Elizabeth line route from Reading and Heathrow in the west to Abbey Wood and Shenfield in the east will commence by mid-2022.

Stopping services started operating from Paddington to Reading on 15 December 2019.

The two critical paths for the project remain the complex assurance and handover process for the railway, and software development for the signalling and train systems. Both involve safety certification for the Elizabeth line. These must be done to the highest standards to ensure the reliability of the railway from day one. Nearly 200,000 documents need to be completed as part of the assurance and handover process and safety certification.

Whitechapel station is now ready to start trials. As this is the first station to reach this critical point, learnings and lessons are being shared and implemented across the programme to further improve the process.

Significant work has taken place within the tunnels to support readiness for trials. This includes connecting the central section to the national railway radio system and assurance by the London Fire and Emergency Planning Authority of the public address system.

* This information is withheld for reasons of commercial sensitivity

Appendix

2019/20 strategic milestone performance

Our 2019/20 strategic milestones for the projects or programmes covered in this report are listed below. The RAG status indicates delivery forecast against the current plan date in line with the following key:

- On time or early
- 1-89 days late
- 90 or more days late

Commentary is provided on milestones that are forecast to be delivered significantly (more than 90 days) late. These milestones also indicate the history of forecast date movements by showing the RAG status and variance (the number of days difference) between the plan date and the forecast date at each quarter end. Programme impact and mitigations are also detailed.

Milestone description	Plan date	Actual/forecast date	Status
Major Projects			
Four Lines Modernisation ■			
First customer services start on the new higher capacity moving block signalling system	30 Apr 19	17 Mar 19	Complete ■
Use of the new, higher capacity signalling system for customer service extends to the north side of the Circle line and to all other lines	1 Jan 20	22 Feb 20	■
Poor reliability performance in earlier migration areas has required prioritisation of software improvements. While we work on these issues with our contractors, it is clear that we will not make the February 2020 milestone forecast date and are working on a mutually agreed schedule for the remainder of the migration areas.			
Piccadilly Line Upgrade programme ■			
Complete the concept design of new Piccadilly line rolling stock and present first look walkthrough of air-cooled trains	15 Jan 20	1 Nov 19	Complete ■
Network extensions			
Northern Line Extension ■			
Track installation complete	28 Jun 19	3 May 19	Complete ■
Essential power supplies available at all sites for testing and commissioning work to begin	16 Mar 20	25 Feb 20	■
Silvertown Tunnel ■			
Contract to design, build, operate and maintain the tunnel begins	29 Oct 19	21 Nov 19	Complete ■
The milestone was late due to the legal challenge to the contract award.			

Milestone description	Plan date	Actual/forecast date	Status
Barking Riverside Extension ■			
Main works commence for Barking Riverside Extension	19 Apr 19	19 Apr 19	Complete ■
Completion of 16-day Network Rail blockade (works to support new viaduct)	4 Aug 19	3 Aug 19	Complete ■
Major stations ■			
Bank station – commence construction of new triple escalator tunnel to serve DLR customers at Bank station and relieve congestion	31 Mar 20	26 Jan 20	■
London Underground			
Station renewals and enhancements ■			
22 lift and escalator replacement and refurbishments complete on London Underground	31 Mar 20	17 Feb 20	■
Tottenham Hale – new station entrance and concourse opens to the public	31 Mar 20	14 Dec 20	■
Due to the location of the Tottenham Hale project, there have been significant challenges in delivering the project. These include gaining the required access to the railway and the interface requirements with the London Underground/Network Rail stations, and that of the interchange project with the West Anglia Main Line upgrade works. We are working collaboratively with our supply chain and Network Rail to mitigate any delay to the programme and are working to resolve ongoing access issues which may restrict the programme.			
Accessibility ■			
Eight more London Underground stations become step-free	31 Mar 20	27 Jul 20	■
Currently forecasting two out of the eight stations (Mill Hill East and Ickenham) to be completed by the milestone date. Challenges including delayed planning permissions, unforeseen ground conditions and contractor delays have affected the programme for the remaining 6 stations (Amersham, Osterley, Debden, Ickenham, Wimbledon Park and Northolt). We are working with our contractors to deliver step-free access at these stations as soon as possible. These eight stations form part of the Mayor's commitment to open 15 additional step-free stations by 2020.			
Track renewals ■			
Install 7.5km of new track across the London Underground network	30 Mar 20	5 Mar 20	■

Milestone description	Plan date	Actual/ forecast date	Status
Rolling stock renewals ■			
Victoria line fleet programme lift – first train enters production	31 Jul 19	1 Jul 19	Complete ■
Jubilee line fleet refurbishment is complete and all trains are compliant with the Rail Vehicle Accessibility Regulations	31 Jan 20	9 Dec 19	■
Central line – begin refurbishment and life extension work on first production train	31 Mar 20	16 Oct 19	Complete ■
Signalling and control ■			
Piccadilly line interim signal control upgrade complete	26 Jan 20	17 Oct 19	Complete ■
Power, cooling and energy ■			
First solar panels installed, representing the start of large-scale solar generation on our buildings	18 Feb 20	15 May 20	■
The project is making progress, on track according to the revised delivery schedule, and we continue to work collaboratively with our contractor to further mitigate the delays.			
Surface			
Healthy Streets ■			
Old Street Roundabout removal – main works start	31 May 19	28 May 19	Complete ■
Highbury Corner Gyratory removal – traffic switches to two-way system	13 Jul 19	22 Apr 19	Complete ■
Cycleway 4 – detailed design for Jamaica Road signed off	30 Aug 19	4 Jul 19	Complete ■
Direct Vision Standard – launch of system to enable heavy goods vehicle drivers to request Direct Vision Standard permits	28 Oct 19	28 Oct 19	Complete ■
Cycleway 9 – completion of detailed design for Kew Bridge section	6 Dec 19	5 Dec 19	Complete ■

Milestone description	Plan date	Actual/ forecast date	Status
Air quality and environment ■			
Launch of central London ULEZ scheme	8 Apr 19	8 Apr 19	Complete ■
All buses in Low Emission Bus Zones are retrofitted with new bespoke exhaust systems to reduce nitrogen oxides and particulate matter	31 Dec 19	16 Aug 19	Complete ■
Assets ■			
Concept design for the renewal of major assets starts	1 Dec 19	9 Aug 19	Complete ■
Bus driver facilities – install permanent facilities on 42 routes	31 Mar 20	31 Mar 20	■
Public transport ■			
Repairs to Blackhorse Lane Bridge – demolition of Blackhorse Lane Bridge begins	17 Aug 19	15 Apr 19	Complete ■
White Hart Lane Station Capacity Upgrade – existing station entrance demolition complete	27 Mar 20	24 Dec 19	■
Other ■			
Technology and Data			
Enable pay as you go in order to support the Elizabeth line extension to Reading	8 Dec 19	8 Dec 19	■
Preferred bidder selected for rolling out a 4G network across all London Underground lines and implementing other connectivity improvements across London	31 Mar 20	31 Mar 20	■

About Transport for London (TfL)

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

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

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

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

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

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

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

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

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



Programmes and Investment Committee



Date: 5 March 2020

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 March 2020. It describes the work undertaken since the last report presented to the Committee on 18 December 2019.
- 1.2. A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by 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 Recommendations

- 2.1 **The Committee is asked to note the Independent Investment Programme Advisory Group's Quarterly Report and Review of the Effectiveness of First and Second Lines of Defence, 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 February 2020 is included as Appendix 1 to this paper.

4 IIPAG Review of the Effectiveness of First and Second Lines of Defence

- 4.1 Under its Terms of Reference, IIPAG is required to advise on the performance of the first and second lines of assurance for projects and programmes, and to provide guidance and share best practice to ensure the continued improvement of TfL's internal assurance processes. IIPAG's report for 2019 is included as Appendix 2 to this paper.

5 Management Response

5.1 The IIPAG review of the effectiveness of first and second lines of defence is welcomed by TfL. It recognises that good work is being undertaken and the observations are constructive and will help the business to continue to improve.

5.2 Our management response to IIPAG's key observations is set out below:

First Line of Defence

5.3 **Capability** – where necessary, capability of first line is being improved by training and on job learning as appropriate, e.g. in the Investment Delivery Planning team (IDP) with business case training and London Underground Renewals and Enhancements team's upskilling of project managers.

5.4 We note IIPAG's desire for a 'TfL way' to be developed in key processes. The TfL Programme Management Office (PMO) will continue to implement good practice, and ongoing improvement to compliance with TfL's Pathway process will aid this. IIPAG have advised they will continue to monitor this over the next year and consider if further investigation of this area is required. The business will continue to work with them as appropriate.

5.5 **Project Governance** – A pan-TfL review of project governance is being undertaken across the investment programmes. This will ensure governance is simplified as far as is practicable and better understood throughout the business. The outcome of this review will be shared with IIPAG.

5.6 **Approval Process** – The use of Integrated Assurance and Gate Strategy (IAGS) documents to manage the relevant first and second line assurance will be discussed with IDP, PMO and TfL's Project Assurance team.

Second Line of Defence

5.7 **Rigour in planning of execution of assurance** – IIPAG's comments on the use of IAGS documents are covered above under paragraph 5.6.

5.8 In relation to TfL Project Assurance defining minimum documentation requirements for project assurance reviews, as we advised at the last Committee meeting this is something that TfL Project Assurance has already taken action on. A number of reviews have already been deferred as a result.

5.9 For sub-programme reviews, TfL Project Assurance has implemented a new process using continuous assurance data to inform the reviews, and to assist in planning and input by IIPAG. Further to this, TfL Project Assurance and IIPAG have a session planned for 9 March 2020 to assess the success of this new approach and to consider any further improvements.

5.10 **Developing capability in the Second Line of Defence** – the Head of Project Assurance acknowledges the points IIPAG has made about the mixed capability within her team. Using secondments, she has already brought two sponsors into the team to widen its experience and broaden the capability within the team. This also provides a development opportunity for the individuals to develop and see a wider perspective of TfL and gain insights as a result. There will be some

vacancies in the team in the next few months and filling these is an opportunity to continue to further strengthen the team, balanced with not losing valuable experience of existing team members.

- 5.11 The new framework agreement for external experts will go live in the Spring. There will be ten companies on the framework who will support project reviews going forward which doubles what we have now. This will ensure we can draw on more experience and focus on key areas of concern.
- 5.12 Going forward. TfL Project Assurance will also consider whether peer reviews or independent specialist advice is more appropriate especially for complex projects.

List of appendices to this report:

Appendix 1: Independent Investment Programme Advisory Group - Quarterly Report February 2020

Appendix 2: Review of the Effectiveness of First and Second lines of Defence - 2019

A paper containing exempt supplemental information is included on Part 2 of the agenda.

List of Background Papers:

None

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Independent Investment Programme Advisory Group – Quarterly Report February 2020

This paper will be considered in public

1. Introduction

- 1.1. This is a report of the activities of IIPAG since our last report, covering the period from November 2019 to early February 2020. It provides an update on issues arising from project and sub-programme reviews, findings to date from our cross-cutting work, and early thoughts on our work programme for 2020/21.

2. New recommendations and strategic advice

- 2.1. Our new insights at the strategic level this quarter come from our annual review of the effectiveness of the first and second lines of defence. We believe that more disciplined use of the laid down process for planning of project assurance activities will make them both more efficient and more effective at keeping projects on track. We have also highlighted the inconsistent use of often excellent standard tools and methods in areas such as cost estimating, risk and contingency provision and processes for inspection, testing and commissioning,

3. IIPAG reviews of projects and sub-programmes

- 3.1. We have participated with TfL Project Assurance (PA) in the following reviews.

Programmes

- Civils, Bridge & Structures
- Air Quality & Environment
- Technology & Data
- Surface Assets
- LU Fleet Renewals and Enhancements
- Four Lines Modernisation

Projects

- Ultra Low Emission Zone Expansion
- Westway
- Barking Riverside Extension

- 3.2. Our reviews continue to find a lot of good work in TfL, but also some areas for improvement. We have also continued to engage with the business through participation in Investment Group, London Underground Executive (LUX) and Surface Transport Leadership Group.

4. Recurring themes

- 4.1. In previous reports we have noted six common themes to the recommendations from reviews we had undertaken so far: capability and resources; programme and portfolio management; cost and risk; schedule pressure; governance; and value for money. We are finding that these continue to be consistent themes, though there has been progress on engineering resource, as discussed below. One recurring issue which affects a number of the themes is the role and effectiveness of the Programme Management Office (PMO), on which we plan to undertake a cross-cutting review in the early part of 2020/21.

5. Management progress on IIPAG recommendations

- 5.1. The accompanying paper by PA reports on progress with management's responses to our recommendations.

6. Cross-cutting work

- 6.1. Our 2019/20 annual work programme identified a number of areas which we would consider on a cross-cutting basis. We continue to make progress on these, as set out below.
- 6.2. Project Reporting. Our last quarterly report described the findings of our review of project reporting. Our proposals were discussed at the November 2019 Investment Group meeting, and as a result a new standard 'single version of the truth' template for reporting, reflecting our recommendations, was presented to and agreed at the January Investment Group. We continue to feel that simple, concise, consistent project reporting will help the executive and the Board understand the health of the project portfolio, and that improvement is needed in tracking progress against original budgets and schedules.
- 6.3. Review of the effectiveness of the first and second lines of defence. Our terms of reference require us to undertake this review annually, but this is the first time that the current IIPAG membership has done so.
- 6.4. We found that the first line of defence, provided by a generally motivated and capable workforce, is working well in many cases. Project governance is often effective, with projects guided through appropriate approval and assurance steps. However, we considered that tightening the planning of assurance and more consistent use of standard tools and methods, would improve the scrutiny and control of project deliverables.
- 6.5. We found that the PA team, which provides the second line of defence, has good knowledge of the project portfolio and manages an appropriately risk-based programme of assurance interventions. There are opportunities to strengthen the team and its advisors by deploying stronger and more experienced resources and we made some suggestions for how that can be done.
- 6.6. We anticipate reassessing the effectiveness of the first and second lines of defence in a year's time. By then, we look forward to seeing a simpler, more comprehensive approach to planning of assurance, more evidence of compliance

with standard tools and methods in the first line of defence, and progress towards weightier and more impactful input from the second line of defence.

- 6.7. Engineering Resource. Following concerns we raised in early 2019, the organisation reviewed the demand for and supply of engineering resources in early summer 2019, and took action to address the shortfall, including through a significant recruitment exercise. We have had a number of discussions with TfL leadership during this process. Post transformation, the new approach to managing engineering resource is now more bedded in. We believe that there will need to be ongoing monitoring of the situation to ensure that the number and mix of resources continues to meet TfL's needs.
- 6.8. Project Initiation. From reviews we had undertaken we had raised questions about the process, governance and affordability of projects at the early initiation stage. TfL itself was also aware of these issues and was developing new approaches. Our work in this area therefore focussed on reviewing the steps being taken by TfL. The PMO has introduced a formal Stage Gate 0 to its Pathway process, and TfL Finance is strengthening the governance for Project Initiation. These steps are very welcome and should address the issues we had raised, but it will be necessary to review how they work in practice. We intend to review the success of these initiatives in 2020/21.
- 6.9. On-going reviews. Our annual Benchmarking review is nearly complete. Work is underway for the reviews on value for money and TfL standards. We had decided to delay our review of assurance of Commercial Development until transformation changes in that area had settled down; a review is now being scoped and will be undertaken in the coming months.

7. Work Plan for 2020/21

- 7.1. IIPAG's budget for 2020/21 is the same as in 2019/20, at £395K. We have found this budget to be adequate for the current year, and expect a small underspend. This is due to the fact that as a new team we did less cross-cutting work at the beginning of 2019/20.
- 7.2. Our work in 2020/21 will be to provide third line assurance and strategic advice in the following areas:
- Sub-programme reviews
 - Project Assurance Reviews for individual projects over £50m, either at key gate stages or as an annual check
 - On-going scrutiny of the most significant major projects such as Four Lines Modernisation
 - Cross-cutting reviews of strategic and systemic issues.
- 7.3. As last year, we will take a risk-based approach to targeting our effort on sub-programme and project reviews. We are currently reviewing the risk assessment of the sub-programmes and projects with Project Assurance.
- 7.4. We are also reviewing the areas for cross-cutting work in 2020/2021. We expect that in many cases these will be a continuation, review or expansion of cross-cutting work we have undertaken this year. We will be having discussions with TfL

leadership and Internal Audit to help shape this programme. We welcome suggestions from the Programmes and Investment Committee and Audit Committee.

7.5. Our 2020/21 work programme will be presented with our next quarterly report.

List of appendices to this report:

None

List of Background Papers:

None

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Review of the Effectiveness of First and Second line of Defence - 2019

1. EXECUTIVE SUMMARY

- 1.1. The scale and diversity of projects in Transport for London present a serious delivery challenge. The well-established first and second lines of defence model of assurance is helping the organisation to meet that challenge and our review has found many positives. But there is no room for complacency. Preventable project setbacks do still occur. Projects sometimes proceed on weak business cases, project controls are not always sufficiently strong, and cost and schedule overruns do sometimes result.
- 1.2. We have found that the first line of defence, provided by a generally motivated and capable workforce, is working well in many cases. Project governance is often effective, with projects guided through appropriate approval and assurance steps. However, the financial, commercial and delivery approval and assurance structures are complicated, and the mandated approach to planning assurance is more honoured in the breach than in the observance. We think that tightening the planning of assurance and more consistent use of standard tools and methods, will improve the scrutiny and control of project deliverables which can make a meaningful difference to the likelihood of project success.
- 1.3. The Project Assurance team, which provides the second line of defence, has good knowledge of the project portfolio and manages an appropriately risk-based programme of assurance interventions. We think that there are opportunities to strengthen the team and its advisors by deploying stronger and more experienced resources and we have made some suggestions for how that can be done.
- 1.4. We anticipate reassessing the effectiveness of the first and second lines of defence in a year's time. By then, we look forward to seeing a simpler, more comprehensive approach to planning of assurance, more evidence of compliance with standard tools and methods in the first line of defence, and progress towards more impactful input from the second line of defence.

2. INTRODUCTION

- 2.1. As in many large organisations, Transport for London deploys a 'Three Lines of Defence' Assurance Model. The **first line of defence** is undertaken by those who own and manage the risk. For investment projects this means the sponsors, project managers and functional specialists who run the projects, and the senior managers to whom they report. The first line is supported by the Programme Management Office (PMO).
- 2.2. Sometimes the PMO itself is referred to as being the *first line of defence*. We think this terminology is unhelpful because it risks letting the project deliverers off the hook for self- assurance. The PMO provides process and resource, and PMO staff chair the gate reviews, but the PMO is not accountable for project performance. In

our view, the PMO is a good source of insight and early warning, but it is not the first line of defence.¹

- 2.3. The purpose of the **second line of defence** is to provide objective assurance from outside of the line. For investment projects the main provider of the second line is the Project Assurance (PA) team, although other functions, such as HSE, Engineering, Finance and Commercial also contribute. The **third line of defence** for investment projects is mainly provided by the Independent Investment Programme Advisory Group (IIPAG).
- 2.4. Our Terms of Reference require that we *'advise the Mayor of London, the TfL Board, TfL Board Committees – primarily the Audit and Assurance Committee and the Programmes and Investment Committee – and the TfL Executive with regard to the performance of the first and second lines of assurance for projects and programmes, providing guidance and sharing best practice to ensure the continued improvement of TfL's internal assurance processes.'* This report fulfils this requirement for 2019.

3. CHARACTERISTICS OF EXCELLENT FIRST AND SECOND LINES OF DEFENCE

- 3.1. In combination, first and second line assurance can, at its best, increase compliance, surface difficult issues and drive up delivery confidence. Conversely, at its worst, it can nit-pick, cry-wolf or sugar-coat while adding bureaucracy and delay. Here we set out our view on what makes for good assurance.

First Line of Defence

- 3.2. In terms of impact on successful delivery, the first line of defence is the most important. If the first line is working well, then inadequacies in the second line may not matter. However, no amount of second line assurance will compensate for poor ownership and control by the deliverers, sponsors and their managers. In our view the first line of defence is working well when
 - projects are led by experienced and capable leaders who make good use of subject matter experts and advisors,
 - high quality tools and methods are deployed with care (we have in mind, for example, approaches to cost and schedule estimation, risk and contingency),
 - project governance is effective and approval processes are rigorous, understood and well planned and, crucially, when
 - the culture in the organisation values and respects scrutiny and challenge.

¹ There is a range of views across TfL about the role and effectiveness of the PMO. IIPAG plans to undertake a review in this area in the course of 2020.

Second Line of Defence

- 3.3. The second line should provide an objective assessment of project status to inform decision-makers at key points in the capital life-cycle, and make recommendations for improvement. In our view the second line of defence is working well when it
- has the right quantity and quality of assurance expertise,
 - understands the projects in the portfolio and takes a risk-based approach,
 - makes good judgements about which issues and risks to escalate,
 - has the courage to speak truth to power and, crucially, when it
 - is supported by senior management, even when its findings are inconvenient or uncomfortable.

4. OUR FINDINGS

First Line of Defence

- 4.1. TfL delivers a large number of projects, many of them very effectively. As a rule, staff seem to us to understand their responsibilities and to behave professionally. At the same time, control of some projects is less than perfect. From time to time, projects are approved against weak business cases. We see instances of unexpected cost and schedule overruns, and contracts that have been let against unstable scopes of work.
- 4.2. In general, we find that larger, stable, long-term projects are better controlled than smaller projects, and that those perceived to have a high political imperative often present a particular challenge. Below we comment specifically on institutional capability, governance and approval processes.
- 4.3. **Capability.** We are regularly struck by the number of outstanding people we meet leading and contributing to the organisation's first line of defence. Of course the capability is not universally strong, but we do think that overall the staff are up to the challenge. However, excellent people are not always delivering excellent results. We come across many sound project processes, methodologies and tools but they are not universally and consistently deployed. We are thinking about, for example, cost estimating, risk and contingency provision and processes for inspection, testing and commissioning. Non-compliance is sometimes driven by short-term expediency, but also by ignorance about where good practice exists and lack of clarity about what is mandated and what is optional. The integration of historically separate organisations and the extent of recent change add to the challenge. These factors contribute to a compliance culture which is not as strong as it could be.
- 4.4. We think the organisation should continue to drive towards consistently high-quality processes, methodologies and tools that become simply 'the TfL way'.
- 4.5. **Project Governance.** TfL understands and respects the need for project governance, and almost all projects are subject to some periodic review at a project

or programme board. From time to time, however, we have reported on examples of less effective governance. In some cases, project, programme and sub-programme governance has been over-complex leading to duplication and confusion. In others, the way projects are grouped into sub-programmes has been fluid which has led to some muddle. Even in the largest projects we sometimes see decisions taken on the hoof in organisational silos rather than through proper governance forums. These instances can undermine the effectiveness of the first line's assurance.

4.6. Our advice is generally to try to make governance structures as simple and stable as possible, and then to work through them except in exceptional circumstances.

4.7. **Approval Processes.** TfL has no shortage of first line of defence process in this area. A typical project will find itself navigating approval processes for:

- i) **Business case, financial authority, project/programme authority and subsequent financial drawdowns.** These processes are driven by the Sponsorship organisation and are aimed at ensuring a good justification, value for money and affordability. Approvals are defined in delegated authorities.
- ii) **Commercial sign-off.** Approvals are required before going to the market, before signing contracts and before amendments and extensions. A sound first line of defence is necessary both to assure good value for money and to mitigate the risk of legal challenge. Approvals are defined in a 'Commercial Toolkit' and given in the Commercial Approval Meeting (CAM).
- iii) **Pathway gates.** These are required at both project and programme levels. They involve a formal meeting, chaired by a representative of the PMO or the project sponsor where stakeholders scrutinise, against checklists, that project deliverables have been appropriately assured and approved, and that the project is ready to proceed to the next phase. This assurance covers the full capital life cycle all the way from the initial definition of requirements through cost estimates and detailed designs to final snagging and defect registers. Unlike financial and commercial approvals, Pathway gates often need to be tailored to each particular project.
- iv) **Technical Approvals.** Design, inspection and testing approvals are managed outside of the Pathway process.

4.8. Our impression is that compliance with approval processes is often good. We seldom hear of unauthorised project expenditure, or of contractors working without commercial cover. In the case of Pathway gates, we note that in recent months only around half of gates have been passed, which seems good evidence that the process has some teeth. In parts of the organisation with a legacy of strong technical assurance, such as railway programmes in LU, there seem to be robust technical approval processes in place. We have, for example, seen a very thorough gate structure for a major LU programme with 25 "ITCHBU" (Inspection, Testing, Commissioning, Handover and Bringing into Use) gates. In other parts of the organisation, the rigour is not so evident. However, projects which fail technically due to poor design or testing are not common, which implies that technical decisions are being reviewed and assured.

- 4.9. However, the interaction between financial, commercial and project approvals is inherently quite complicated. At different points Sponsors, Finance or the PMO may be in the lead. The fact that approvals may be required at project, programme and sub-programme level adds to the complexity. We think that, at times, the approval status of projects is unclear, and that approvals in one sphere do not always recognise the status in another. We have seen, for example, financial drawdowns approved without reference to whether a relevant Pathway gate has been passed.
- 4.10. A vehicle for navigating some of this complexity was introduced in 2013. Now, all but the smallest projects are mandated to have an *Integrated Assurance and Gate Strategy Plan*. This document should define which Pathway gates are relevant and record the first line assurance measures that are required. Tools such as the Pathway Product Management Plan and Pathway Products Matrix are intended to help to tailor the *Integrated Assurance and Gate Strategy Plan*. The Plan should be approved by PA and endorsed by the relevant programme board.
- 4.11. We think that the approach of using an *Integrated Assurance and Gate Strategy Plan* to define the first (and second) line of assurance is completely sound, but have two observations.
- 4.12. The first is that compliance is patchy to say the least. Given that these plans should define the assurance regime for a project, it is telling that many in PA and all in IIPAG were unaware of their existence. In some cases we have found the plans to be completely absent, in others they are superficial or out of date. Some projects use adapted versions of other legacy documents instead.
- 4.13. We stress that this situation doesn't mean that first line of defence assurance is never taken seriously. However, knowledge of, and compliance with the formal process is very low. In our view, what is required is clarity and then compliance.
- 4.14. Our second observation is that the *Integrated Assurance and Gate Strategy Plan* only covers Pathway gates. It therefore misses the opportunity to provide a comprehensive and coherent picture of the whole approval and assurance landscape, including financial, commercial and technical approvals. If these were included, the plan would provide a single route through the approval and assurance labyrinth that could be used by everyone. Without a comprehensive Integrated Assurance and Gate Strategy Plan, or something similar, we think some level of confusion is inevitable, and we do not see how the organisation can ever be systematically sure that first line assurance is being effectively implemented.

Second line of Defence

- 4.15. The current Project Assurance (PA) organisation has existed for nearly a decade and is now led by an experienced TfL Project Manager who has been in position for around ten months. She is supported by a permanent team of twelve including eight Assurance Review Managers who manage the assurance programme and relationships with the projects and programmes. Assurance is provided through ongoing engagement (called Continuous Assurance) and Project Assurance Reviews (PARs).
- 4.16. **Project knowledge and assurance planning.** In our view Continuous Assurance gives PA a good grasp of the important projects. Assurance Review Managers

often sit on programme boards and attend Pathway gate meetings. The new Head of PA has introduced an internal monthly assessment of the status of all the major projects. This is an effective way of highlighting the areas of greatest concern and allows the team to take a risk-based approach. Only occasionally do projects slip through the net.

- 4.17. The *Integrated Assurance and Gate Strategy Plan* (referred to above under the first line of defence) should be approved by PA, but never is. Instead, Project Assurance own what is essentially a duplicatory document, known as an *Integrated Assurance Plan* (IAP) which records the plan for assurance for each project. IAPs appear to be current and helpful, but they are focussed on the second and third lines of defence and are very light on the first line of defence. This means that PA miss the opportunity to insist on an appropriate level of first line assurance.
- 4.18. When project schedules are tight or shifting, there can be a tendency for second line assurance to get squeezed. We have, for example, seen projects being reviewed without a current business case, or before submissions for project authority were written. In one case a PAR occurred before the relevant Pathway gate had taken place. When this happens the second line of defence is compromised, and we think it should only occur in exceptional circumstances and with agreement of the Head of PA.
- 4.19. **Assurance expertise.** Second line assurance is only ever as good as the people who provide it. In TfL, PARs are usually led by an Assurance Review Manager and supported by other PA staff and external experts who are drawn from a pool of long-term consultancies with expertise in the transport sector. PARs conclude with an engagement between PA, the external expert and the project team, in which the findings and recommendations of the review are discussed.
- 4.20. The ideal assurance team member is assertive and demanding, but always has a supportive mindset. In our view the capability in the PA team is somewhat mixed. Some add real value by surfacing and evidencing the most important issues while others provide less insight. As a rule, the team is more comfortable with less contentious matters of data and process compliance (such as whether the Estimated Final Cost breaches the Financial Authority) than with challenging judgements about deliverability and risk.
- 4.21. We are not convinced that the external expert pool is always adding value. Sometimes we see bland reports offering little insight and challenge, particularly in the areas of deliverability: cost, schedule and commercial. Our view is that specialised transport input is not always required. Project generalists with commercial and delivery experience can often add more value.
- 4.22. We think that the Head of PA should consider ways to enhance the capability available to her over time. We have the following suggestions.
- 4.23. For internal resourcing, we encourage senior TfL leaders to see a time-limited (say 18 to 24 month) assignment in PA as being an excellent development opportunity for up-and-coming talent in the organisation. Exposure to a diverse range of projects and delivery challenges is a great way to learn. We also consider it to be good practice to utilise project staff from elsewhere in the organisation on specific PARs. We acknowledge that this is difficult in a delivery environment which is

already under pressure, but we do see it working very well in other public sector organisations that are equally stretched. For external support, we encourage PA to consider ways to access broader commercial and delivery expertise. We have heard that the limited volume of work may put off more capable firms. In Central Government, PAR work is often undertaken by individuals rather than consultancy firms, and we suspect this would offer better value for money.

- 4.24. **Assurance at Sub-Programme level.** ‘*Sub-Programme*’ is the TfL term for a collection of related projects and programmes.² At present there are twenty-two Sub-Programmes. They are very diverse – some being collections of loosely related projects and others being essentially one large project. Sub-Programmes are assured annually by PA who present a report to the Programmes and Investment Committee (PIC), often to inform a particular sanction decision.
- 4.25. In our view second line assurance of Sub-Programmes is weaker than that of Projects and Programmes. Reviews are undertaken by interviewing key members of staff, typically over a one to two-day period. This approach is not suitable for all Sub-Programmes. PA have recognised this issue and are addressing it by taking a more thoughtful approach to tailoring each Sub-Programme review in light of the particular challenges it faces.
- 4.26. **Escalation of risks and issues.** Our view is that the Assurance Review Managers’ ability and confidence to identify and escalate the most important project issues is somewhat mixed. This is a combination of variable levels of experience, and an understandable concern that their opinion may not carry weight with more senior TfL staff. Sometimes team members helpfully use the Head of PA or IIPAG members as a conduit for the most challenging recommendations. After each review, PA use a concise one-page report to raise issues and make recommendations. So called ‘critical issues’ require formal escalation and must be resolved before a project may proceed. They are therefore viewed seriously by deliverers and sponsors. To be effective, the ‘critical issue’ lever needs to be pulled judiciously. PA have to find the balance between escalating too many issues and failing to call out the most important ones. In our view PA are getting this judgement about right most of the time.
- 4.27. Beyond the one-page reports, the Head of PA reports on her main concerns each month to the ST Leadership Board (STLB), LU Executive: Investment meeting (LUX) and to Investment Group. She is also open with IIPAG about her concerns. In our judgement, despite being in role for less than a year, she is doing an excellent job. She maintains a good network and listens to feedback from the organisation, while defending her ground where appropriate.
- 4.28. **Courage and Support.** The real test of assurance in an organisation comes when it is necessary to escalate very bad news. On those occasions it is critically important that senior management supports the second line, even when its findings may be inconvenient or uncomfortable. Thankfully, we have not had to support the head of PA on such an issue this year, but we are confident that she has the courage to raise difficult subjects and makes good judgements about which are the most important issues to escalate. We encourage senior executives to maintain

² This terminology is unhelpfully counter-intuitive because a ‘Sub-Programme’ often includes one or more ‘Programmes’. Many businesses would use the term ‘Portfolio’ for this level in the hierarchy.

periodic contact with the head of PA to ensure that when the day comes, there is already a relationship of trust in place.

5. IMPROVEMENT OPPORTUNITIES

- 5.1. Many of the improvement opportunities we have described in this report are systemic and will not be grasped overnight. In accordance with our Terms of Reference, we will, in a year's time, revisit the effectiveness of the first and second line of defence. Below we state the main areas we would like to see improve over that period.

Rigour in planning and execution of Assurance

- 5.2. We believe that tightening up the planning and execution of the first line of defence can improve the scrutiny and control of project deliverables and make a meaningful difference to the likelihood of project success. In our view, it is reasonable to expect that, over the next year, the organisation should achieve **more consistent application of standard approaches** to, for example, cost estimating, risk and contingency provision and processes for inspection, testing and commissioning. In particular we are looking for a much higher degree of **compliance with its existing mandatory requirement that all large projects should have an *Integrated Assurance and Gate Strategy Plan*** in which the first and second line assurance requirements are defined. To drive improvement, these plans should be current, comprehensive, approved by PA and endorsed by project governance. They should be coherent between project, programme and sub-programme levels.
- 5.3. Getting to a single integrated plan which includes commercial, financial and technical approvals as well as project gates may not be completely straightforward, but the advantages of a single coherent view are so great that we would like to see this attempted too, at least by way of a trial.
- 5.4. We also hope to see better planning resulting in fewer instances of the second line of defence being compromised by lack of time. **PA should define the minimum documentation requirements for PARs, and should ensure that reviews only take place when these are met, except in exceptional circumstances agreed with the Head of PA.**

Developing capability in the Second Line of Defence

- 5.5. We think that there is room for the second line of defence to have a greater impact on successful delivery. **We are looking for the Head of PA to continue to develop her team, and its external advisors, so as to add more weight and credibility** to identify and escalate the main issues and risks in projects, and experience to propose really impactful recommendations for improvement.
- 5.6. In the body of the report we have made some suggestions which may help. These include using PA as a development opportunity for rising stars in the organisation, utilising experienced delivery professionals on project reviews, and accessing the market of external project reviewers.

6. SUMMARY OF RECOMMENDATIONS

6.1. Over the next year:

- the organisation should achieve a more consistent application of standard approaches to, for example, cost estimating, risk and contingency provision and processes for inspection, testing and commissioning.
- In particular the organisation should improve compliance with the mandatory requirement that all large projects should have an *Integrated Assurance and Gate Strategy Plan* in which the first and second line assurance requirements are defined.
- Project Assurance should define the minimum documentation requirements for Project Assurance Reviews, and should ensure that reviews only take place when these are met, except in exceptional circumstances agreed with the Head of Project Assurance.
- The Head of Project Assurance should continue to develop her team, and its external advisors, so as to add more weight and credibility.

List of appendices to this report:

None

List of Background Papers:

None

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Programmes and Investment Committee

Date: 5 March 2020

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 between 30 November 2019 and 1 February 2020. A total of nine reviews were undertaken, consisting of three programme and six project assurance reviews.
- 1.2 These reviews gave rise to 31 recommendations being made, of which three were considered to be critical issues. Critical issues are those which the TfL Project Assurance team (Project Assurance) believes should be addressed before projects proceed to the next stage.
- 1.3 Key findings from the reviews undertaken are:
 - (a) commercial resources in some programme areas appear to be stretched and impacting project progress;
 - (b) inconsistency in how well project costs are built up, validated and kept under review; and
 - (c) the management of access to Network Rail land and assets, and the interface between TfL and Network Rail in relation to project works.
- 1.4 A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by 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 assurance activity completed by TfL's second line assurance, provided by TfL's Project Assurance team, and third line assurance, provided by the Independent Investment Programme Advisory Group (IIPAG).

4 Summary of Project Assurance Activity

- 4.1 Three programme reviews were undertaken between 30 November 2019 and 1 February 2020, with IIPAG involved in two. In the same time period six project

assurance reviews were undertaken, with none of these involving IIPAG.

4.2 From the reviews undertaken, a total of 31 recommendations were made by TfL Project Assurance, and all agreed with the respective project teams, of which:

- (a) three were critical issues; and
- (b) 28 were general recommendations.

4.3 From the assurance reviews undertaken, IIPAG made three general recommendations and no critical recommendations, with these agreed with the respective project teams.

4.4 Appendix 1 provides a summary of the critical issues and the actions being taken to address them.

4.5 The following graphs show the number of open recommendations, the number which are overdue, and the number of recommendations closed in the quarter. Of the overdue recommendations, 19 (two by IIPAG and 17 by Project Assurance) are currently critical issues.

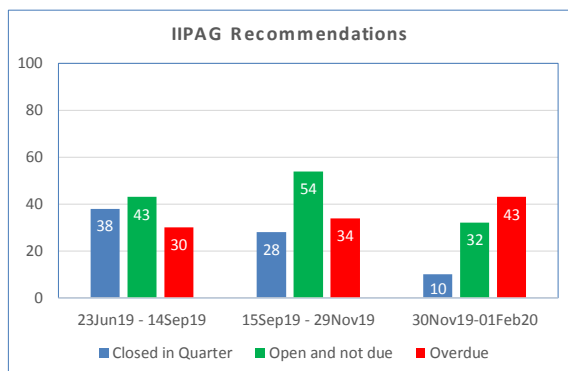


Figure 1: IIPAG Recommendations

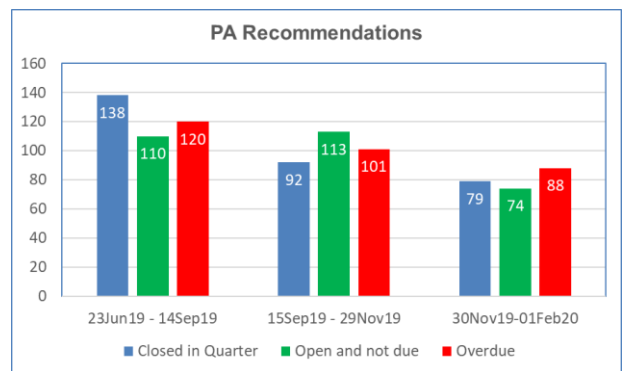


Figure 2: Project Assurance Recommendations

4.6 We continue to work with project teams to ensure that recommendations are acted upon and closed. A number of IIPAG recommendations fell due at the end of December 2019 and in January 2020, this was during the period when the Project Assurance team were focussing on the latest round of programme reviews ahead of the March committee meeting. A verbal update on the number of overdue recommendations will be provided at the meeting.

List of appendices to this paper:

Appendix 1: Overview of Recommendations

A paper containing exempt supplemental information is included on Part 2 of the agenda.

List of Background Papers:

None

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Overview of Recommendations

Critical issues agreed with the respective project teams

Project: Liverpool Street Platform Remodelling		
Raised by	Critical Issue	Management Response
Project Assurance	Robust risk analysis to be undertaken to include all risks, mitigations and costs plus Monte Carlo at P50 and P80 levels. This will then inform the right level of risk that should be made available to the project or held at programme level.	A full bottom up risk review will be completed with support from the TfL Project Controls team. A Risk and Opportunity Manager has been assigned to this project and will lead on the review. Risk workshops with the relevant stakeholders were held on 9 January and 15 January 2020 as part of this process.

Project: Liverpool Street Platform Remodelling		
Raised by	Critical Issue	Management Response
Project Assurance	The standard five case model for business cases should be used, ensuring the finance case demonstrates affordability.	The business case narrative will be updated using the latest template and each of the five cases will be referenced within it. The current format for business case modelling will be adopted and the outputs will be incorporated into the narrative.

Project: Taxi Private Hire Re-Let		
Raised by	Critical Issue	Management Response
Project Assurance	Instruction to Tender (ITT) documentation must go through rigorous peer review ahead of release to the market.	The knock-on effects of previous delays in the programme (and Christmas) have made it a challenge to complete all the paperwork in good time for the issue to market. However, we have taken and addressed the points raised by the assurance review. The documentation was released to market on 8 January 2020.

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Programmes and Investment Committee



Date: 5 March 2020

Item: 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 December 2019, there have been:
 - (a) no decisions taken by Chair's Action;
 - (b) no Mayoral Directions within the Committee's remit;
 - (c) no approvals by the Commissioner; and
 - (d) three approvals by the Chief Finance Officer, who approved Programme and Project Authority for the Custom House station capacity project and the Colindale station redevelopment; and Procurement Authority for the potential Hammersmith Temporary Bridge – contract of detailed design with option to build.
- 1.3 A similar report will be submitted to the Finance Committee in respect of the use of Chair's Action and of Procurement Authority and Land Authority granted by the Commissioner and the Chief Finance Officer in respect of matters within the Finance Committee's remit, together with relevant Mayoral Directions.

2 Recommendation

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

3 Use of authority delegated by the Board since 18 December 2019

- 3.1 There have been no uses of authority delegated by the Board since the meeting on 18 December 2019.

4 Use of Chair's Action since 18 December 2019

- 4.1 Under Standing Order 114, 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 have been no uses of Chair's Action since the meeting of the Committee on 18 December 2019.

5 Programme and Project Authority Approvals since 18 December 2019

- 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 Sub-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 Sub-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. As the Committee receives and approves more Sub-Programmes, the number of individual approvals at project level will diminish.
- 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.
- 5.4 The Committee will also be informed of the implementation of any applicable Direction from the Mayor relating to TfL's Programmes and Projects. There is nothing to report for this meeting.

Approvals by the Commissioner

- 5.5 Since the last meeting of the Committee, the Commissioner has not approved any Programme and Project Authority requests within the Committee's remit.

Approvals by the Chief Finance Officer

- 5.6 Since the last meeting of the Committee, the Chief Finance Officer has approved two Programme and Project Authority requests within the Committee's remit, relating to the Custom House station capacity project and the Colindale station redevelopment (Appendix 1).

6 Procurement Approvals

Approvals by the Commissioner

- 6.1 Since the last meeting of the Committee, the Commissioner has not approved any Procurement Authority requests in respect of matters within the Committee's remit.

Approvals by the Chief Finance Officer

- 6.2 Since the last meeting of the Committee, the Chief Finance Officer has approved one Procurement Authority request in respect of matters within the Committee's remit, relating to the potential Hammersmith Temporary Bridge – contract of detailed design with option to build (Appendix 1).

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 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:
<https://tfl.gov.uk/corporate/about-tfl/how-we-work/how-we-are-governed>. 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.
- 7.8 Since the last meeting of the Committee, no Mayoral Directions to TfL within the Committee's remit have been published.

List of appendices to this report:

Appendix 1: Summary of Programme and Project Authorities and Procurement Authorities approved by the Chief Finance Officer.

List of Background Papers:

None

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Appendix 1: Summary of Approvals

Summary of Programme & Project Authority Approvals

Approval Date	Contract / Project Name	Value (£k)	Approval
05/12/2019	Custom House station capacity	24,800	Chief Finance Officer
30/01/2020	Colindale station redevelopment	18,760	Chief Finance Officer

Summary of Procurement Authority Approvals

Approval Date	Contract / Project Name	Type	Value (£k)	Approval
06/02/2020	Potential Hammersmith Temporary Bridge – contract of detailed design with option to build	Contract Award	24,500	Chief Finance Officer

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Programmes and Investment Committee



Date: 5 March 2020

Title: Crossrail 2

This paper will be considered in public

1 Summary

- 1.1 In 2015, TfL submitted to the Department for Transport (DfT) a Strategic Outline Business Case (SOBC) describing the need for development of Crossrail 2. In fulfilment of agreements between the Mayor and the Government, TfL has since completed two major updates of this SOBC, and supported an Independent Affordability Review (IAR), independently chaired by Mike Gerrard.
- 1.2 The IAR's conclusions were reflected in the updated SOBC issued in September 2019. The revised SOBC is expected to be considered as part of a Spending Review during 2020.
- 1.3 The TfL and Network Rail Integrated Project Team (IPT) is presently consolidating the work to date into an updated baseline for the scheme, while developing designs to support third-party works such as HS2 and preparing plans to start the detailed scheme development in the event that the Government and the Mayor decide to move forward following the Spending Review.
- 1.4 This paper describes the Crossrail 2 business plan for FY20/21. An increase in Programme and Project Authority of £13.0m, to the full total of £130.27m Financial Authority, is requested to support planned work until the outcome of the Spending Review is known.
- 1.5 The current phase of Crossrail 2 involves outline design and delivery planning, to facilitate agreement between the funders of an approach to take the scheme forward. Crossrail 2 is a key part of the Mayor's Transport Strategy, and supports the Mayor's strategic objective of 'new homes and jobs', most directly by supporting construction of up to 185,000 additional new homes. It is supported by Network Rail and is a key part of its Rail Upgrade Plan, freeing up capacity on the rail network and allowing towns and cities such as Cambridge, Southampton, Basingstoke, Woking, Guildford and Portsmouth to benefit from more frequent services.
- 1.6 A supplemental paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by 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.

Crossrail 2				
Existing Financial Authority (Since 01/04/2014)	EFC ¹	Existing Programme and Project Authority	Additional Authority Requested	Total Authority
£ 130.27 m	£ 127.52 m	£ 117.27 m	£ 13.00 m	£ 130.27 m

2 Recommendation

- 2.1 The Committee is asked to note the paper and the supplemental paper on Part 2 of the agenda and approve additional Programme and Project Authority of £13m, bring the total Programme and Project Authority to £130.27m.**

3 Background

- 3.1 Crossrail 2 is a proposed new railway serving London and the wider South East. It will increase capacity on the most congested parts of Underground and mainline rail routes into London, improve the connectivity of the capital's network and enhance the customer experience for rail travellers. The scheme supports the Mayor's strategic objective of 'new homes and jobs', most directly by supporting construction of up to 185,000 additional new homes.
- 3.2 Since February 2015, TfL's Managing Director of Crossrail 2 has led an Integrated TfL and Network Rail Project Team (IPT) in developing the scheme. Following the 2016 agreement between the Secretary of State and the Mayor to fund the development of the scheme on a 50:50 basis, two Senior Responsible Owners (SROs) were appointed; TfL's Chief Finance Officer on behalf of the Mayor of London and the DfT's Director-General of High-Speed and Major Rail Projects on behalf of the Secretary of State. Sponsor support to TfL's Chief Finance Officer is provided via the Investment Delivery Planning and Commercial Finance directorates.
- 3.3 In response to the submission of an updated SOBC in 2017, the Chancellor announced a review of the funding and financing of the scheme. The Secretary of State and the Mayor subsequently agreed to jointly sponsor an IAR of Crossrail 2, examining ways in which the funding, financing and the costs and risks of the scheme could be improved. The independent panel was chaired by Mike Gerrard, former Managing Director of the Thames Tideway Tunnel project.
- 3.4 A draft IAR Report was submitted to the Secretary of State and the Mayor in 2018.

¹Includes cost of scheme development carried out by TfL prior to 1 April 2016 and the funded scheme development activities to the assumed date of the 2019 Budget Statement.

4 A Second Revision of the Strategic Outline Business Case

- 4.1 A further SOBC update was submitted in 2019. That third SOBC incorporated the work carried out during the IAR (as amended by several subsequent supplementary studies), the latest demand forecast assumptions and the impact of Crossrail on Crossrail 2's funding and financing assumptions.

5 The 2020/21 Business Plan

- 5.1 The Crossrail 2 business plan for FY20/21 supports the revised decision-making timetable which assumes a Spending Review submission in summer 2020 and a decision in November 2020. The level of resource and expenditure through to the Spending Review is constrained by the funding committed by DfT and TfL (see Section 6 below) and work is proposed to cover securing new funding from the Spending Review, mitigating risks and preparing for the next stage. To help minimise costs during 2020/21, measures have been taken to deploy Crossrail 2 staff in support of other business objectives, while maintaining the critical knowledge required to ensure the value of the investment made to date is not lost.
- 5.2 Demobilising the IPT and supply chain at this stage, before a decision on the next steps of the scheme, would create a loss of momentum and project knowledge. Re-mobilising the IPT and potentially re-procuring the supply chain to achieve the current level of readiness would introduce additional expenditure and delay scheme development if a positive decision were subsequently obtained at the Spending Review. It is therefore considered that the marginal cost in maintaining a critical mass and the supply chain up to the Spending Review represents good value for money.
- 5.3 It is anticipated that the likely outcome from the Spending Review will emerge during the summer and this will enable the joint SROs to confirm priorities for the IPT through to the Spending Review announcement in 2020.
- 5.4 Previously, the IPT planned to re-consult on the scheme in, successively, autumn 2016, summer 2017, early 2018 and early 2019. On each occasion, the consultation was postponed, pending the outcome of funding, financing and affordability work. TfL and the DfT are keeping the need for safeguarding under constant review to ensure that the proposed route can be protected in a cost-effective manner. Local consultation will continue as the project progresses. Before starting the next stage of development - the consents application stage - a route-wide consultation on any proposed first phase of Crossrail 2 will be undertaken.
- 5.5 The 2019 SOBC will inform the Crossrail 2 submission to the 2020 Spending Review, but will be supplemented by additional material created by the IPT and the DfT. The Spending Review submission will need to consider the impact of Crossrail on TfL and GLA borrowing capacity.
- 5.6 Additional design development was required to confirm the viability of some aspects of the scheme as presented in the 2019 SOBC, consuming design resources and slowing consolidation of the scheme baseline. Rather than continue with assembly of a baseline solely based on the IAR of 2018, TfL has

opted to compile an updated baseline to incorporate the further adjustments made in the 2019 SOBC drafting. This baseline will be completed in Q1 of FY20/21, and will form the basis for a routewide consultation and support the next stage of development of the scheme.

- 5.7 As in previous years, the IPT will undertake work to ensure the Crossrail 2-compatibility of major stakeholders' designs, including the British Library, HS2, the Thames Tideway Tunnel, and Network Rail's Euston redevelopment.
- 5.8 Before starting the next stage of development - assumed to be preparation of a Hybrid Bill submission - there will be a need to undertake a routewide consultation. The DfT, meanwhile, has initiated a review of the consents strategy to understand the potential to use an alternative consenting route.
- 5.9 The IPT has considered a range of scenarios to test the impact of the various consenting routes on delivery timescales. Following a decision by the Government and Mayor on the scope of the scheme, the timescale for development and funding, then a paper will be submitted to the Committee to seek the required approvals.

6 Financial Implications

- 6.1 The reduced remit of the 2019/20 Business Plan (implemented once it became clear that a substantive decision on the scheme would not be taken as part of the 2019 spending round), has reduced the 2019/20 costs as advised to the Committee at the meeting 6 March 2019. The funding made available for IPT work to November 2019 has been used to support the entirety of the 2019/20 financial year. Total spend to the end of 2019/20 is now estimated at £114.52m, compared to the previous estimate of £116.30m cost up to November 2019.
- 6.2 The 2020/21 TfL Business Plan has made provision for £13.0m for work up to the Spending Review outcome. The revised Financial Authority is therefore £130.27m, and estimated final cost to the Spending Review announcement is £127.52m. It is requested to retain the delta of £2.75m accumulated by not spending previously-granted Programme and Project Authority in view of the unconfirmed Spending Review timing, as in previous years.
- 6.3 The Committee is requested to approve Programme and Project Authority to the full amount of Financial Authority.
- 6.4 It is assumed that once the decision is made to proceed to the next stage, both the Sponsors will review the development contributions made to date, in light of the timescales agreed at that time and any development funding allocated by the Spending Review outcome. TfL has assessed the full 2020/21 cost of supporting development of the scheme under its preferred timescales, but will not formalise budgetary provision for the sum needed (beyond the £13m) until agreement is reached with Government following the Spending Review.

7 Proposal

- 7.1 It is proposed that the current Programme and Project Authority is increased by £13.00m to £130.27m, in order to support the Spending Review deliberations and catalogue the work already completed. TfL will request Programme and Project Authority for any further work beyond the Spending Review from the Committee at the first opportunity following any agreement between the Mayor and the Government.

8 Assurance

- 8.1 An Independent Assurance Panel (IAP) has been established to provide an independent view to the SROs on key aspects of the project. The IAP provides assurance through constructive challenge of the IPT at review meetings and by considering the advice received from subject-specific Expert Review Groups.
- 8.2 David Orr CBE FREng has been appointed to Chair the IAP, and Alison Munro CBE and Mike Gerrard have accepted the Chair's invitation to sit as permanent members. The IAP membership is supplemented by industry leaders whose expertise is relevant to the particular topic under review.
- 8.3 The IAP has, to date, provided a report on the 2019 SOBC and issued advice over processes for an in-progress re-estimate of costs.
- 8.4 On submission of the 2019 SOBC, a second Project Assessment Review (PAR) was carried out by the IPA on behalf of HM Treasury. The PAR Report was reviewed by the DfT prior to its examination of the SOBC, and will form part of the Spending Review submission.
- 8.5 Prior to submission of this paper, an Integrated Assurance Review of the project was carried out by TfL Project Assurance. A representative of IIPAG attended the review meeting, and supports Project Assurance's conclusions.

List of appendices to this report:

A paper containing exempt supplemental information is included on Part 2 of the agenda.

List of Background Papers:

None

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Programmes and Investment Committee



Date: 5 March 2020

Item: London Underground Renewals and Enhancements Fleet Programme

This paper will be considered in public

1 Summary

- 1.1 This paper sets out the request for the 2020/21 Programme and Project Authority for the London Underground (LU) Renewals and Enhancements (R&E) Fleet Programme (the Programme). This is the fourth annual submission to the Committee.
- 1.2 With the Programme now established, the focus of this year's paper is to:
 - (a) present the Programme's achievements since the last submission in March 2019;
 - (b) summarise key planned delivery to 2028/29; and
 - (c) update the Committee on the progress of the Programme.
- 1.3 The paper requests approval for Programme and Project Authority of £20.6m (outturn including risk), bringing the total authority to 2028/29 to £709.0m. Table 1 provides a summary of the request.
- 1.4 The Programme will return annually to the Committee to renew and validate approval for future years.

Table 1: Summary of the Programme and Project Authority request up to and including 2028/29

LU Fleet Programme				
*Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
£1007.3m	£1007.8m	£688.4m	£20.6m	£709.0m

*Financial Authority will be revised in line with Programme and Project Authority when the Budget is approved by the Board in March 2020.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and approve additional Programme and Project Authority of £20.6m (outturn including risk), bringing the total authority to 2028/29 to £709.0m.**

3 Background

- 3.1 The Programme delivers projects across LU's existing fleet of passenger rolling stock, engineering vehicles (EVs) and specialist trains to provide a safe, accessible and reliable service offering to the travelling public, whilst simultaneously reducing the cost of track maintenance.
- 3.2 The Programme supports the Mayor's Transport Strategy (MTS) objective of 'providing a good public transport experience' and contributes to the aim within the MTS for 80 per cent of trips in London to be made on foot, by cycle or using public transport by 2041. The Programme also supports LU's priorities for 'Safety and Reliability', 'Customer', 'People' and 'Affordability'.
- 3.3 In support of the MTS and LU's priorities, this has been part achieved in recent years by introducing new trains on the Victoria line, and through the Four Lines Modernisation (4LM) upgrade with a single fleet of new trains on the Metropolitan, District, Hammersmith & City and Circle lines.
- 3.4 Additionally, TfL has a contract with Siemens Mobility Limited (awarded November 2018) for new rolling stock to replace the life-expired trains on the Piccadilly Line. It is essential to keep existing passenger fleet in service until they are replaced. The Programme achieves this by investing in targeted renewals and upgrades to ensure performance and regulatory compliance.
- 3.5 Exemptions to the Rail Vehicle Accessibility Regulations (RVAR) have been granted by the Department for Transport (DfT). The Bakerloo line fleet has until the end of 2021 and the Central and Waterloo & City line fleets have until the end of 2024 to complete agreed disability access modifications. The Piccadilly line has been granted an exemption until the end of 2026 to coincide with the fleet replacement.
- 3.6 EVs are core to the delivery of LU's track maintenance and renewals programme. LU's fleet of EVs comprise of locomotives (used for haulage), wagons of various designs for different activities and plant equipment e.g. cranes and tampers. LU also relies upon specialist vehicles e.g. Track Recording Vehicle (TRV) for specific mandatory safety assurance duties. Due to an investment shortfall over many years the EV fleet is operating beyond its design life. Overhauls and frequent reactive interventions are required to ensure availability and to reduce the risk of impacting service operations. The Programme addresses this issue by providing investment in overhauls, modifications and replacement of the EV fleet.

4 Delivery Progress in 2019/2020

- 4.1 Several projects have been completed since the March 2019 submission to the Committee. An overview of these is provided below.
- 4.2 A five-year project to complete structural repairs on all 36 Bakerloo line trains has been completed, ensuring they will run safely. The initial budget for this project was £70m; however, the project was completed for circa £55m. This was achieved by increasing delivery from one train to two trains at a time and making incremental efficiencies in the production process.

4.3 The fleet was suffering from corrosion and needed crucial repairs. Trains were transferred from Stonebridge Park depot to Acton where the work was managed and delivered in-house by a 110-strong team of welders, fitters, inspectors, charge-hands and engineers using LUs expertise in repairing its older 70s trains. As the floor of the train was removed to complete the repairs, RVAR compliant contrasting flooring was installed.

Figure 1: Bakerloo line, examples of structural repairs (before and after)



Figure 2: Bakerloo line, change in flooring (before and after)



4.4 To enable this project, a maintenance building in Acton was refurbished with improved welfare and office facilities. This building is now being used as part of the Central line Improvement Programme (CLIP) and will maintain LU internal capability to deliver future projects.

4.5 During 2019/20, the Jubilee line mid-life refurbishment project was completed with the 19 remaining trains modified to meet the RVAR compliance deadline of 1 January 2020. All 63 trains now have compliant wheelchair bays installed. In addition, access hatches have been installed in the floor to improve fleet maintenance's ability to access and rectify faults. The project took the opportunity to repair any identified corrosion issues and a new floor covering was installed. Small amounts of corrosion were rectified by removing affected areas and then filling them with a small metal disc. This was successfully trialled and is now a process which can be used instead of welding which is costlier and time consuming.

4.6 This project was delivered internally at Stratford Market depot where the Jubilee line trains are maintained. Completing the work at the depot allowed for the challenging 14-day delivery time for each train to be achieved.

Figure 3: Jubilee line new wheelchair bays and refurbishment, before and after



4.7 Table 2 provides progress and successes since the March 2019 submission to the Committee.

Table 2: Project updates since March 2019

Project Title	Project Outcomes	Delivery Progress Since March 2019
<p>Central line Improvement Programme (CLIP) & New Workshop</p>	<p>Ensures trains on the Central and Waterloo & City lines remain safe and fit for purpose until replacement.</p> <p>The New Workshop facilitates rolling stock project and heavy maintenance delivery.</p>	<p>CLIP is installing a prototype traction system on the first train at the supplier's site. A second train is being fitted with the prototype on-train computer as well as a prototype bay for wheelchair users (Figure 7) and other accessibility modifications. A third train has been provided to CLIP to begin work. The first train will be completed in Autumn 2020.</p> <p>Heavy maintenance of the fleet is being integrated into CLIP. Initial feasibility has been undertaken and is maturing.</p> <p>The construction of the New Workshop in Acton has continued with the foundations, steel structure and exterior cladding completed. Initial track work has also been completed and the pit roads and internal walls are under construction. Fit out with mechanical and electrical services have started. By Summer 2020, the New Workshop at Acton is scheduled to be available for CLIP to start enable for full production.</p>
<p>Locomotive Capability</p>	<p>Complete feasibility studies on heavy haulage capability to support EVs and the Track Renewals Programme.</p>	<p>The project has commenced feasibility and planning.</p>
<p>EV Overhauls Life extension</p>	<p>Life extension and overhaul of EVs to enable them to remain in service until their planned replacement.</p>	<p>Removal of asbestos in existing battery locomotives has started to ensure TfL is compliant with Asbestos Regulations.</p>

Project Title	Project Outcomes	Delivery Progress Since March 2019
Remote Track Monitoring (RTM)	A series of work packages to deliver LU's track assurance requirements.	A new project has been initiated to mitigate impacts from the 4LM signalling upgrade on the existing Track Recording Vehicle (TRV). This will allow for its continued operation on sub-surface lines. This will be completed by Autumn 2020. In addition, life extension works for the TRV have aligned with a new project to ensure continuous service until a replacement is in service in 2023/24.
Mechanised Renewals Vehicle (MRV)	The design and manufacture of specialised vehicles to mechanise deep tube concrete track renewal.	Following a trial of a proposed solution, procurement activities for the design and build of a prototype were cancelled as tender responses did not provide a value for money and/or a technically compliant solution. The prototype is now being progressed in-house. Operation of the first vehicle is planned for early Summer 2020.
EV Depot Enabling – Ruislip	Enabling Ruislip depot to support new EVs	Ruislip Depot concept plan developed, and site surveys commissioned to develop designs.
Bakerloo line Life Extension and RVAR	Accessibility modifications and reliability improvement work to extend the life of the Bakerloo line trains until they are replaced.	Having completed the structural repairs, design of RVAR related accessibility improvements has progressed into prototyping. Installation of wheelchair bays alongside a new passenger information system is scheduled to complete by the end of 2021.
Mechanisation of Points & Crossings Renewal (Mod P&C)	Testing and commissioning of the system for it to be ready for delivery of the major track renewals from 2020/21.	November 2019 saw the successful delivery of two Kirow cranes and eight tilting wagons ahead of schedule as part of the Mod P&C programme. The operating lease for the Kirow cranes was reviewed and a change in financing model to direct purchase was recommended.
Mechanisation of Ballast Replacement	Increased productivity of track ballast replacement.	This has been deferred until a ballasted track renewal approach is confirmed. The next year will be focused on the development of ballasted track renewal approach within the Track Asset Strategy.

Project Title	Project Outcomes	Delivery Progress Since March 2019
Rail Adhesion Systems	Investigate low adhesion management systems to mitigate the effect of leaf-fall on the LU network.	This was deferred to allow Track Asset Strategy and Operations to develop a rail adhesion management strategy.
New Wagons	Procurement of 73 wagons to support track renewal and maintenance activities.	Production of seven wagons commenced for testing. Procurement of an additional two new wagons for the RTM replacement track monitoring capability has been agreed. Delivery of all 73 new wagons by end of 2021.
Train Cab J-Door Security Improvements	Provision of increased control for Train Operators over unauthorised access into the operator cabins from the train saloon.	The project developed a prototype which was installed on a train to demonstrate how the new system would work. A contract has now been placed for the design and supply of the new security system. Installation will begin first on the Waterloo & City line trains and will progress across all fleets over the next year.
Victoria line Projects	Refurbishment works including repair of flooring as well as reducing dust inside the saloon.	Schedule of cleaning completed to date and floor repairs completed where required. New cleaning contract negotiated to reduce cleaning costs. This rolling schedule of works will continue until 2024/25.

4.8 Figures 4 to 9 provide examples of the work being delivered by the Programme.

Figure 4: New Workshop under construction



Figure 5: Prototype bay for wheelchair users – Central line trains (part of CLIP)



Figure 6: An example of the new equipment CLIP will be fitting beneath the Central line train



Figure 7: CLIP will be replacing old batteries with new batteries on the Central line trains



Figure 8: Mod P&C Tilting Wagon System in Tunnel Simulation



Figure 9: Mod P&C Kirow Crane



5 Key deliverables for the Programme to 2028/29

- 5.1 The Programme currently comprises the projects in Table 3 (all cost figures include risk and inflation; these figures show the plan up to 2028/29).
- 5.2 Table 3 includes the value of all rolling renewals through to the end of the business plan period (2024/25), as well as planned spend on the locomotive capability project which stretches to 2028/29.
- 5.3 Financial Authority is based on the 2019 Business Plan as the current 2020 Budget has not yet been authorised. The significant changes since the 2019 Business Plan have included the movement of a portion of the EV overhauls Financial Authority to a more appropriate area of R&E reducing the Estimated Final Cost (EFC) compared to Financial Authority. Conversely the EFC of Mod P&C has increased to include the change in financial arrangements from an operating lease strategy to procuring the Kirow cranes and tilting wagons directly from the supplier.

Table 3: Summary of the Programme

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
CLIP and New Workshop	486.0	485.5	483.2	2.3	-
Locomotive Capability	187.7	187.7	0.2	0.6	186.9
EV Overhauls	55.0	33.3	11.2	10.4	11.7
Remote Track Monitoring	24.8	24.2	2.8	3.1	18.3
MRV	22.4	26.8	3.7	1.0	22.1
Engineers Vehicle Depot Enabling	4.0	3.9	1.9	2.0	-
Passenger Fleet Feasibility Studies	1.2	1.2	-	1.2	-
Bakerloo line passenger fleet life Extension and RVAR	88.9	90.5	97.4	-	-
Mod P&C Renewal	10.0	26.5	27.3	-	-
Jubilee line passenger fleet mid-life refurbishment.	25.6	25.6	25.6	-	-
Mechanisation of Ballasted Renewal	26.0	26.0	0.2	-	25.8
Rail Adhesion Management Systems	14.3	14.4	7.3	-	7.1
New Wagons	9.6	11.5	11.9	-	-

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
Train Cab J-Door Security Improvements	11.6	9.9	11.0	-	-
Victoria line passenger fleet	4.7	4.7	4.7	-	-
Future Projects including remote condition monitoring on the Jubilee line fleet, rolling stock underframe scanning system to improve maintenance capability as well as Northern, Jubilee and Victoria line life extension and Railhead Profiling.	35.5	36.1	-	-	36.1
Totals	1007.3	1007.8	688.4	20.6	308.0

6 Financial Implications

- 6.1 The Committee approved a total Programme and Project Authority of £85.6m for 2019/20 in the last annual submission and the forecast year end spend is £73.5m.
- 6.2 This underspend is largely attributable to a CLIP labour ramp up deferral as a result of the New Workshop in Acton being delayed into mid-2020. As a result, CLIP has altered its delivery programme and re-forecast spend into 2020/21. The Bakerloo line structural repairs project completed under authority. Additionally, on this fleet, there have been supply issues relating to design and materials for the RVAR project also pushing spend into 2020/21. Other in year underspend is due to smaller scale issues such as the decision to deliver the MRV in-house after the market failed to provide a compliant tender return. The impacts of the directly procure the Mod P&C vehicles from the supplier (refer to paragraph 5.2) has offset some of the in-year underspend.

6.3 A summary of the 2019 Business Plan to 2028/29 by financial year is shown in Table 4.

Table 4: Fleet Programme Financial Implications to 2028/29

Costs and Funding (£m)	Prior Years	2020/21	2021/22	2022/23 to 2028/29	Total
Cost (Outturn)					
Existing Programme and Project Authority	218.9	59.5	87.3	322.7	688.4
This Authority Request	-	7.8	11.1	1.7	20.6
Future Authority Requests	-	-	-	308.0	308.0
Financial Authority*	214.3	110.9	149.4	532.7	1,007.3
Programme EFC	216.1	66.1	96.7	628.9	1,007.8

* Financial Authority is based on the 2019 Business Plan as the 2020 Budget has not yet been authorised.

7 Challenges, Opportunities and Lessons Learnt

7.1 **Challenges:** The increase in CLIP production will be complex and challenging, requiring support from across LU. A key dependency for this is the completion of the New Workshop which is required for CLIP to increase to five trains in production. The delivery of this facility is delayed as some details in design and scope required more effort than originally envisaged. If there is any further slip there will be an impact CLIPs schedule. CLIP is mitigating this challenge through utilisation of alternative facilities on the Acton site.

7.2 **Opportunity:** The RTM project require two additional wagons as host vehicles for the new track geometry measuring system. A contractual opportunity in the New Wagons Project has helped deliver the additional wagons, reducing procurement activities and leverages economy of scale, providing a value for money solution.

7.3 **Lessons Learnt:** Lessons learnt through the MRV tendering exercise informed the Programme about the capability of the market to develop innovative engineering solutions that can meet LU's requirements and standards. As a result, LU are designing and building the solution in-house using MRV mock-ups and site demonstrations. In addition, the Train Cab J-Door Security Improvements tendering exercise ensured specifications are clear and ready for effective supply chain engagement. Similarly, the replacement track monitoring capability phase within the RTM project will follow the pre-market engagement exercise from MRV project. This will also ensure that there is a mature market for the track geometry measurement technology.

8 Equality Impact Assessment

8.1 The Programme will be delivered in accordance with the Equality Act 2010. As projects progress through feasibility and design, consideration will be given to the need for an Equality Impact Assessment.

9 Assurance

Progress on IAR recommendations

- 9.1 TfL Project Assurance and the Independent Investment Programme Advisory Group (IIPAG) undertook an assurance review of the Programme in January 2020, where no critical issues were identified.
- 9.2 Recommendations were made in the TfL Programme Assurance and IIPAG reviews, which have been addressed as detailed in the management response.
- 9.3 An Integrated Assurance Plan for the Programme has been agreed with TfL Project Assurance for the following 12 months including the project-level reviews that will take place over the course of the year.

List of appendices to this paper:

None

List of background papers:

IIPAG and TfL Assurance Reports

Management response to IIPAG and TfL Assurance Reports

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Programmes and Investment Committee



Date: 5 March 2020

Item: London Underground Signalling and Controls Programme

This paper will be considered in public

1 Summary

- 1.1 This paper sets out the Financial Authority and Programme and Project Authority requests for the 2020/21 London Underground (LU) Renewals and Enhancements (R&E) Signalling and Controls (S&C) Programme (the Programme). This is the fourth annual submission to the Committee.
- 1.2 With the Programme now established, the focus of this year’s paper is to:
 - (a) present the Programme’s achievements since the last submission in March 2019; and
 - (b) summarise key planned delivery to 2024/25.
- 1.3 The paper requests approval for Programme and Project Authority of £47.9m (outturn including risk), bringing the total Authority to 2024/25 to £196.1m. Table 1 provides a summary of the request.
- 1.4 The Programme will return annually to the Committee to renew and validate approval for future years.

Table 1: Summary of the Programme and Project Authority request up to and including 2024/25

LU R&E Signalling and Control programme				
Existing Financial Authority*	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
£185.9m	£217.5m	£148.2m	£47.9m	£196.1m

* Financial Authority will be revised in line with Programme and Project Authority when the Budget is approved by the Board in March 2020.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and approve Programme and Project Authority of £47.9m (Outturn including risk) to extend the life of Central line signalling and control systems and to progress depot signalling upgrades, bringing the total Programme and Project Authority to £196.1m.**

3 Background

- 3.1 Signalling and control systems are essential for the safe and efficient operation of train services. Some of LU's current signalling and control systems date to the early 1960s, are obsolete and difficult to maintain. This R&E programme was originally established to extend the life of the current systems until upgraded under the Four Lines Modernisation (4LM) Programme or the Deep Tube Upgrade Programme (DTUP) and to ensure obsolescence risk is minimised.
- 3.2 The Four Lines Modernisation (4LM) Programme is currently replacing signalling and control systems on the District, Metropolitan, Hammersmith and City and Circle lines with a single system. This will be progressively commissioned with full benefits realised of faster journeys and up to 32 trains per hour (tph) in Central London by 2023.
- 3.3 The signalling and control systems on the Piccadilly, Central, Waterloo and City and Bakerloo lines were planned to be replaced as part of DTUP, however TfL's financial challenges in recent years have resulted in this upgrade programme being revisited. This is currently in progress.
- 3.4 The Victoria, Jubilee and Northern line signalling, and control systems currently have no significant interventions planned as these have been upgraded in recent years. As a direct result of using modern signalling to support capacity uplifts for LU's service offering, system obsolescence is however becoming more of a concern. This is particularly the case on the Jubilee and Northern lines. The pace of change within electronics means that some elements of the system become unsupportable in a much shorter time frame than mechanical components. TfL is managing obsolescence in conjunction with the original supplier so that these systems can be maintained and operated through its lifecycle.
- 3.5 The Programme supports the Mayor's Transport Strategy (MTS) objective of 'providing a good public transport experience' and contributes to the aim within the MTS for 80 per cent of trips in London to be made on foot, by cycle or using public transport by 2041. The Programme also supports LU's priorities for 'Safety and Reliability', 'Customer', 'People' and 'Affordability'.

4 Delivery Progress in 2019/2020

- 4.1 Several projects have successfully progressed, and some have completed since the March 2019 submission to the Committee. An overview of these is provided below.
- 4.2 The Piccadilly line Interim Control Upgrade (PICU) is now fully commissioned and operating successfully as the new control centre on the Piccadilly line. Delivered in-house, this project has provided a new control room, with a new control system within an existing empty TfL building. The building itself has been refurbished to modern security standards and incorporates a lift, making it the first accessibility compliant control centre on the TfL network. As well as the existing train fleet, this project solution will support new trains currently scheduled to be delivered by 2026.

- 4.3 The new control facility and system has been providing full line control since September 2019 without any service affecting failures. The project has been completing snagging works within the building and updating the control system to fine tune it for the operational end users.

Figure 1: PICU control computers and the PICU graphical user interface



- 4.4 Point machines, which move the rails to allow a train onto a different route, have been replaced across the network under the 'M63 point machine' replacement project, rationalising the number of point machine variants previously used. Whereas before, LU had seven variants, there are now two on the Central, Sub-Surface, Jubilee, Northern and Piccadilly lines. This has led to a reduction in the amount of maintenance training required as well as the number of unique spares required to keep the points work safe and reliable. The project has completed the replacement of 81 sets of points.

Figure 2: Examples of M63 type points and new SureLock point machines



4.5 Table 2 provides progress and successes on projects that are ongoing since the March 2019 submission to the Committee.

Table 2: Project updates since March 2019

Project Title	Project Outcomes	Delivery Progress Since March 2019
Northumberland Park Depot Control System (DCS) Upgrade	Upgrade of 1960s equipment that enables train movements within the only depot serving the Victoria line. The concept design is such that it could be rolled out to any LU train depot.	A contract was awarded for the concept design of the DCS. This project is currently due to complete at the end of FY 2023/24. Early contractor quotes for detailed design and delivery have provided more cost certainty however this was higher than expected.
Central line signalling and control (S&C) life extension	Replacement of obsolete components and life extension of critical systems.	<p>Good progress has been made on the signals concept design with five of seven packages completed and contract negotiation has commenced to progress a first tranche into detailed design.</p> <p>Control system concept design is continuing, and migration plans are being developed.</p>
Bakerloo line S&C life extension	Replacement of obsolete and poor performing signalling assets.	<p>Power enabling works has completed and energy efficient light emitting diode (LED) technology has been rolled out to replace filament lamps in all tunnel sections.</p> <p>Software for the central computer has been re-written in modern language and tested.</p> <p>There have been efficiencies within both the signalling and control projects this year. On signalling, by free-issuing the LED lamps to Maintenance, these have been installed at no cost to the project saving £140k. On the control system, by taking software validation in-house, the project has realised a saving of £147k.</p>

Project Title	Project Outcomes	Delivery Progress Since March 2019
Transmission Based Train Control (TBTC) Signalling Obsolescence	Management of component obsolescence within the signalling systems on the Jubilee and Northern Lines.	Projects have been accelerated to mitigate obsolescence risk.
Upgrade of the Central line customer information system (CIS) server and station equipment	Communication systems upgrade.	Software has been tested for the Central line CIS system. Hardware for the stations is under test and preparatory site works have taken place.
Upgrade of the Waterloo and City (W&C) line control system servers to manage obsolescence and cyber security risk.	Management of obsolescence and cyber security risk.	The W&C project has commenced replacing computer hardware and the operating system on the Waterloo & City line control system, letting a contract to address obsolescence and cyber security risk.
Asset Condition Works	Projects arising from the annual Asset Condition Report (ACR) focusing on safety and reliability initiatives. These works bring assets into compliance and address a prioritised list of condition concerns.	<p>The removal of track capacitors containing PCBs (Polychlorinated Biphenyls), a hazardous material has begun. All surveys are complete, and a contract has been awarded for the supply of replacement, compliant units. We are on target to meet our commitment to the Environment Agency to remove these hazardous substances.</p> <p>Separately, a project has commenced the manufacture and installation of insulated covers over live electrical contacts within signalling power boxes. These covers reduce the risk of electrocution, standardises the appearance and condition of the assets and brings this item into compliance. Seventeen per cent of the network has been completed.</p>

5 Key deliverables for the Programme to 2024/25

5.1 The Signalling and Control Programme comprises of the following projects outlined in Table 3 (all figures include risk and inflation up to 2024/25).

5.2 Financial Authority information is based on the 2019 Business Plan as the 2020 Budget has not yet been authorised.

Table 3: Summary of the LU R&E Signalling and Control Programme

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
Central line signalling and control life extension Replacement of obsolete and failing components with modern equivalents.	57.2	82.4	58.7	23.7	-
Northumberland Park depot signalling and control upgrades	14.3	20.6	12.2	6.8	1.6
Bakerloo line signalling and control life extension Replacement of obsolete and high-risk equipment including transferring software to an up-to-date programming language and replacement of depot control panel.	20.5	22.0	9.5	12.5	-
Northern and Jubilee lines signalling and control obsolescence management Audit of components and production of an obsolescence management plan. The implementation of this plan will be the subject of a future authority request.	26.0	23.7	3.7	-	20.0

Description	Financial Authority (£m)	Estimated Final Cost (EFC) (£m)	Existing Programme and Project Authority (£m)	This Authority Request (£m)	Future Authority Requests (£m)
Piccadilly line signalling life extension Asset stabilisation of signalling equipment and compliance works.	7.1	8.2	3.3	4.9	-
Control and Information life extension Waterloo & City line control system hardware replacement and Central line customer information system replacement.	2.1	2.1	2.1	-	-
Ongoing Projects - Sub Total	127.2	159.0	89.5	47.9	21.6
Point machine conversion Standardisation of equipment to electronic drives across the network.	9.4	9.4	9.4	-	-
Piccadilly line interim control system upgrade	49.3	49.1	49.3	-	-
Projects closing in 2019/20 - Sub Total	58.7	58.5	58.7	-	-
Programme Total	185.9	217.5	148.2	47.9	21.6

6 Financial Implications

- 6.1 The Committee approved £17.5m for 2019/20 in the last annual submission and the forecast year end spend is £15.3m.
- 6.2 The underspend (c.£2.2m) is largely attributable to efficiencies being made, access constraints to the operational railway to carry out work, and delays in the contracting processes.

- 6.3 Contractor quotes have increased the EFC on both the Central line life extension and Depot signalling projects. The refined cost for the Central line Signalling reflects maturity in the designs and confidence in deliverability. Opportunities, efficiencies and value engineering activities will be progressed where possible to reduce overall spend.
- 6.4 A summary of the 2019 Business Plan to 2024/25 by financial year is shown in Table 4.
- 6.5 The Authority request in this submission brings the Programme and Project Authority to £196.1m up to 2024/25. [This submission requests £10.2m of Financial Authority in addition to the existing £185.9m, as well as £47.9m of further Project and Programme Authority.]

Table 4: Signals and Controls Programme Financial Implications to 2024/25

Costs and Funding (£m Outturn)	Prior Years	2020/21	2021/22	2022/23	2023/24	2024/25	Total
Existing Programme and Project Authority	87.0	21.4	18.1	15.6	6.1	-	148.2
This Authority Request	-	27.2	9.6	7.2	3.0	0.9	47.9
Future Authority Requests	-	-	3.6	7.1	5.8	5.1	21.6
Financial Authority*	87.0	24.8	20.6	31.3	16.2	6.0	185.9
Programme EFC	86.8	48.6	31.3	29.9	14.9	6.0	217.5

* Financial Authority will be revised in line with Programme and Project Authority when the Budget is approved by the Board in March 2020.

7 Challenges, Opportunities and Lessons Learnt

Challenges

- 7.1 The Central line S&C life extension project presents an immediate challenge, with the quotation for the signalling portion of the work being significantly higher than expected. This work is crucial to manage obsolescence of the aging systems and is required to ensure ongoing operability. There are opportunities to mitigate some of this cost and reduce the duration of the project, specifically using closures to reduce the number of interventions needed at each site. Value engineering will continue to take place to optimise the projects.
- 7.2 The Piccadilly line may also require further works depending on the timescales for replacement of the signalling system. Life extension here is likely to be on a renewals basis being cognisant of the new train fleet. Although the development of life extension scope is more complex for the Central line, lessons learnt will be carried across to the Piccadilly line.

- 7.3 The discontinuation of the DTUP signalling procurement has meant that the strategy for signalling and control upgrades has changed. Life extension works were originally intended to ensure safety and reliability until the delivery of an upgrade under DTUP for each of the Piccadilly, Central, Bakerloo and Waterloo & City lines. However, with uncertainty in the timescales for replacement of the S&C systems on the lines, options are being explored. This will look to balance the best value to customers with the timescales and costs involved. This strategy is still under development and will continue in 2020/21.
- 7.4 At Northumberland Park Depot, there have been occasions where requested closures have been cancelled at short notice. This has led to some delays in the delivery of work on site. Additionally, works required to the track to bring this into the tolerance required by the new point detection equipment (a pre-requisite for the new control system) has also reduced the time available for conversions. This has resulted in prolongation as there has not been enough time to carry out the required works.

Opportunities

- 7.5 There remains an opportunity with the development of the Bakerloo line extension to integrate a signalling and fleet upgrade providing greater benefits to passengers. Any extension to the line would require changes to the S&C systems providing opportunity to make incorporate these into a wider business case.
- 7.6 Following the success of the PICU project, there is the possibility that an evolution of this system could be deployed on the Bakerloo line. This would use the knowledge and experience gained on the Piccadilly line to deploy an internally delivered upgrade to the control system.

Lessons Learnt

- 7.7 To secure best value in large contracts, a 'two phase' strategy has been implemented. The approach uses the first phase to gain scope and cost certainty for delivery in the second phase. This approach also reduces the risk which both LU and the contractor are exposed to, reducing the likelihood of project prolongation and unforeseen cost pressures. Lessons from the implementation of the PICU project have been shared with both the DTUP and wider S&C delivery teams. The project has interfaced with several older signalling assets which are like those found across the network. This experience and the challenges which have been faced are of value to the implementation of the full Piccadilly line S&C upgrade.

8 Equality Impact Assessment (EQIA)

- 8.1 The Programme will be delivered in accordance with the Equality Act 2010. As projects progress through feasibility and design, consideration will be given to the need for an Equality Impact Assessment.

9 Assurance

- 9.1 TfL Project Assurance has been undertaking continuous assurance on the S&C Programme on a periodic basis, as it is considered low risk.

- 9.2 No sub-programme review has been undertaken as a result. No critical issues have been identified in the areas reviewed as part of continuous assurance.
- 9.3 An Integrated Assurance Plan for the Programme has been agreed with TfL Project Assurance for the following 12 months and is updated quarterly.

List of appendices to this paper:

None

List of background papers:

None

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Programmes and Investment Committee



Date: 5 March 2020

Item: Piccadilly Line Upgrade - Stage 1

This paper will be considered in public

London Underground: Piccadilly Line Upgrade - Stage 1				
Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
£2,965m*	£2,957m	£3,294m	£0	£3,294m

*The Financial Authority for the 2020/21 – 2024/25 Business Plan was approved on 11 December 2019 by the Finance Committee for £2,010m. The remaining Financial Authority beyond the business plan years was approved as part of the May 2018 submission and is included in the 2019 10-year plan.

1 Summary

- 1.1 This paper updates the Committee on progress with delivery of Stage 1 of the London Underground (LU) Piccadilly Line Upgrade (PLU), following its authorisation in May 2018.
- 1.2 A paper is included in Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by 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 related paper on Part 2 of the agenda.**

3 Background and Context

- 3.1 In May 2018 the Committee approved:
 - (a) Programme and Project Authority for the procurement of new rolling stock and associated infrastructure works for the Piccadilly line; and
 - (b) the award of a contract for the design, manufacture and supply of 94 new Piccadilly line trains to Siemens Mobility Limited with a Fleet Services Agreement for whole life maintenance support.

- 3.2 Policy 16 in the Mayor’s Transport Strategy (MTS) explains that the Mayor, through TfL and the boroughs, and working with stakeholders, will seek to transform London’s rail-based services to provide safer, modern reliable integrated, accessible and user friendly services, with improved journey times and an increase in capacity of at least 80 per cent by 2041 to tackle crowding and facilitate mode shift to rail. The Mayor also aims for 80 per cent of Londoner’s trips to be on foot, by cycle or by using public transport by 2041. The Strategy also states in Proposal 63, ‘the Mayor, through TfL, will invest in the Tube network to improve the capacity and reliability of its train services.’
- 3.3 The Piccadilly line provides key transport links between north and west London as well as between Heathrow Airport, the West End and St Pancras International. The line contributes more than 10 per cent of total LU trips.
- 3.4 Crowding is already prevalent on the Piccadilly line and is expected to increase with population and employment growth in London which is projected to increase by around 22 per cent by 2041 as shown in Figures 1 and 2 below.

Figure 1: Population Growth in London between 2016 and 2041

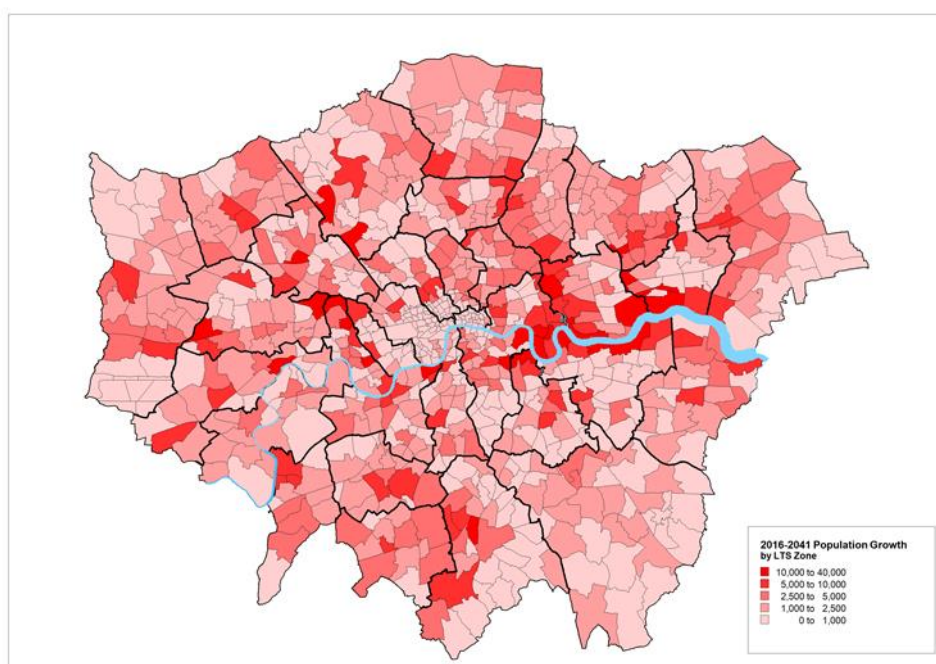
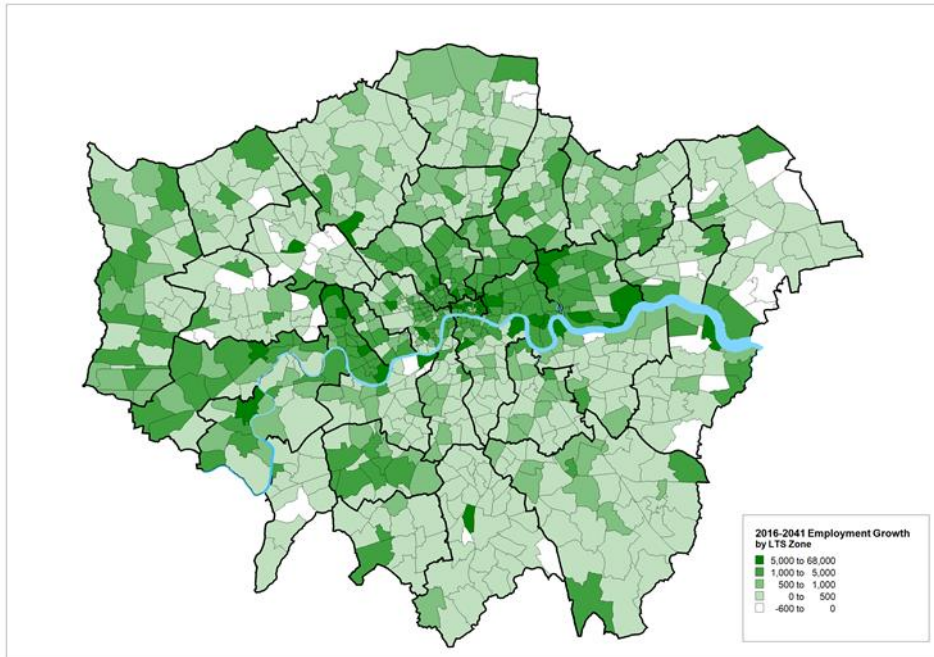


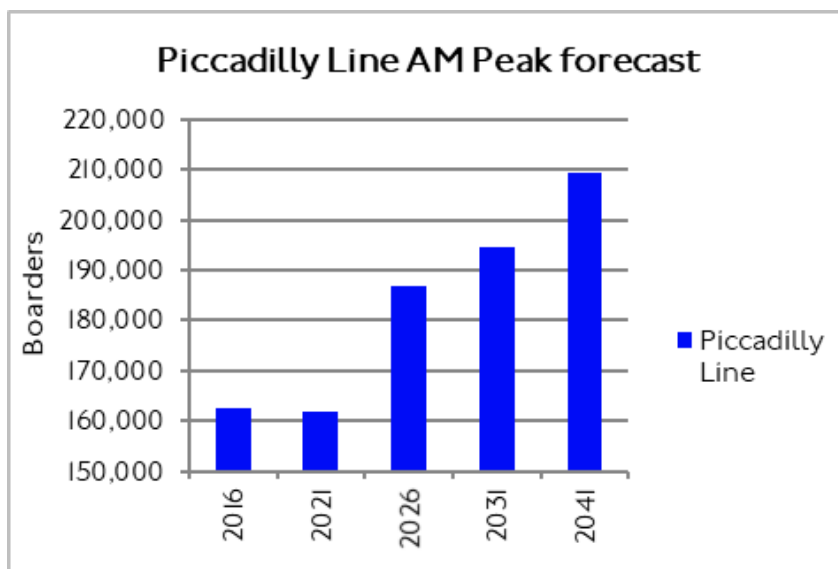
Figure 2: Employment Growth in London between 2016 and 2041



3.5 Additionally, the expansion of Heathrow airport is expected to generate almost 50,000 additional Piccadilly line day trips by 2031.

3.6 As a result, Piccadilly line morning peak demand is expected to increase by nearly 30 per cent by 2041 as shown in Figure 3 below.

Figure 3: Piccadilly line growth 2016 to 2041



3.7 The PLU was established as part of the wider Deep Tube Upgrade Programme to replace life-expired trains and signalling systems and to maximise capacity on the Piccadilly line to accommodate existing and future demand.

3.8 The upgrade of the Piccadilly line is a priority in view of its very high levels of demand, limited fleet size, the age and condition of the existing rolling stock, and the inherent capacity constraints of the existing signalling system.

- 3.9 The PLU is scheduled to be delivered in two key stages:
- (a) Stage 1 – Infrastructure enabling works and replacement of the existing rolling stock fleet with 94 new trains by 2026; and
 - (b) Stage 2 – Replacement of existing signalling system and procurement of seven additional trains to provide high frequency, automatic train operation by 2030.
- 3.10 Stage 1 of the PLU, which is now underway, aims to deliver the following key objectives:
- (a) longer, more spacious and fully accessible walk-through trains;
 - (b) an uplift of peak services from 24 trains per hour (tph) to 27tph, with the increased fleet size;
 - (c) improved service performance and reliability from modern rolling stock and sub-systems;
 - (d) enhanced customer experience through the introduction of air-cooling and improved customer information and security; and
 - (e) improved energy efficiency with reduced annual energy consumption compared with today's Piccadilly line service.
- 3.11 Stage 2 of the PLU, which is currently unfunded, will deliver key service enhancement objectives through a line-wide signalling upgrade, including:
- (a) significant reductions in customer journey times;
 - (b) improved service reliability through automatic train operation; and
 - (c) capability for a peak service of up to 36 trains per hour in the central area from 2030.

4 Programme Delivery

- 4.1 Since Programme and Project Authority was granted in May 2018, work has progressed as planned with the award of a major contract for the supply of new trains to Siemens Mobility Limited in November 2018.
- 4.2 Alongside the commencement of the new trains contract, work has progressed on the development of infrastructure design and preparation for the procurement and delivery of various work packages.

New Rolling Stock

- 4.3 The train concept design stage was completed in November 2019, and detailed design is now underway. The new trains will be of 9-car formation, with an increase in overall train length of 7 metres compared with the existing 6- car trains.

- 4.4 The new train design will be fully accessible and feature walk-through interiors, saloon air-cooling (for the first time on a deep Tube train), all double-doorways to improve boarding and alighting, as well as modern audio/visual communication systems, a new CCTV system covering the platform and train interface for the train operator to view within the cab and improved customer information.
- 4.5 The new trains will provide a 9.5 per cent increase in passenger capacity, compared with the existing Piccadilly line trains at today's service level. This will increase peak trunk capacity from 99,000 passengers at today's service level, to 122,000 passengers with a 27 tph peak service; this represents a 23 per cent overall increase in peak service capacity on the line.
- 4.6 The new trains will be more energy efficient, being capable of regenerative braking (to recover energy from braking as electrical energy for use by other trains). This will be enabled once the existing fleet is fully replaced, to reduce annual energy consumption by nearly 20 per cent when operating a 27 tph peak service.
- 4.7 Train production is on target to start from August 2021, to ensure that the first new train can be introduced into service from Autumn 2024. All the existing Piccadilly line trains will be replaced by mid-2026.
- 4.8 Stakeholder engagement on the train interior design has commenced with concept designs shared with the Independent Disability Advisory Group (IDAG) and the TfL Accessibility Forum in January to elicit feedback and inform the finalised train design.

Infrastructure works

- 4.9 Preparatory work is progressing to schedule with the planning and procurement for the upgrading and modification of Piccadilly line infrastructure to allow the introduction of the new trains in 2024. Such works include:
- (a) localised platform modifications to provide level access to the designated position for wheelchair users in the new trains to meet Rail Vehicle Accessibility Regulations (RVAR) requirements. Design has commenced for the provision of new platform 'humps' at 'step-free' stations;
 - (b) a new CCTV system, which will provide high quality images of the Platform-Train Interface (PTI) into the new train cabs for the train operator to view. This will enable the transmission of real-time visual information to the train operator to ensure the safe departure of the train from the platform;
 - (c) the construction of modern, efficient and environmentally sustainable train maintenance and stabling facilities at Cockfosters and Northfields depots, with increased train stabling capacity at South Harrow sidings;
 - (d) upgrading of the traction power supply and distribution network to provide system capacity to support the increased performance and energy saving features of the new trains (such as regenerative braking); and

- (e) modifications to the existing legacy signalling system to ensure compatibility with new trains as we have done with introducing new rolling stock on other lines.

Operational Readiness

- 4.10 The successful introduction of the new trains onto the Piccadilly line is dependent on the availability of sufficient numbers of fully trained train operators and train maintenance staff. The training process will be supported by the provision of 'Instructor Operators', an initial group of train operators that will operate the first two trains and will be involved in coaching and training their colleagues.
- 4.11 Operational readiness planning is underway in conjunction with the new train design and delivery schedule. Operational leads continue to work closely with the project team to develop a driver training programme and ensure that it remains closely aligned with the supplier delivery schedule using experience gained from the introduction of the 'S' Stock trains on the Sub-Surface lines.

Delivery Strategy

- 4.12 Project delivery has been based on internal and worldwide benchmarking of similar train replacement programmes, including the capturing and embedding of lessons learned into the delivery strategy, including:
 - (a) specification of reliability growth requirements as contractual obligations for new train acceptance;
 - (b) inclusion of requirements for an off-site testing facility to allow train type, reliability and integration testing to be performed away from the LU network;
 - (c) development and delivery of training and maintenance documentation early in the delivery schedule;
 - (d) a contract schedule which has clear interfaces with other line upgrade projects, assets and stakeholders; and
 - (e) on-board and off-train software provided from the train supplier's core product range, to remove interfaces and reliance on third party suppliers for bringing the trains into service.

Innovation and Supply Chain

- 4.13 A PLU Innovation Strategy and Working Group has been formed to explore new and creative working practices and knowledge sharing, and is made up of representatives across the programme, including delivery partners.
- 4.14 This Working Group is currently working with Siemens, and three UK universities focussed on various innovation initiatives, research and train production, and is currently participating in two Innovate UK competitions.
- 4.15 The project is currently working closely with DfT and other partners, as part of the Transport Infrastructure Efficiency Strategy (TIES) and hopes to enable PLU to be a "Living Lab" working with TIES partners to help bring some of these innovations

to bear in the next two years.

- 4.16 Current innovation activities include the automation of track survey data collection process using train mounted scanning equipment, which will reduce the time, resources and track access for infrastructure surveys. This is scheduled to be trialled later this month.
- 4.17 Other projects include the development of aluminium power cabling as an alternative to copper cables, a new design of platform tunnel air cooling panel solution with the aim of improving cooling efficacy and cost effectiveness, and the mechanisation of cable route and cable installation.
- 4.18 Working with Siemens, the project team has ensured that employment and training opportunities have been secured during train design and production including around 80 graduate and apprenticeship positions over the life of the trains contract, with eight of those 80 on the project already.

5 Assurance

- 5.1 An annual Project Assurance Review has been undertaken, led by TfL Assurance as part of the continuous assurance process for this programme.
- 5.2 There are no critical issues. A management response to the recommendations made has been provided and all recommendations have been accepted.

List of Appendices to this Paper:

A paper containing exempt supplemental information is included on Part 2 of the agenda.

List of Background Papers:

Independent Investment Programme Advisory Group (IIPAG) Report 2019

Project Assurance Review 2019

Management Response to IIPAG and Project Assurance Review Reports 2019

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Programmes and Investment Committee



Date: 5 March 2020

Item: Surface Transport Asset Renewals Programme

This paper will be considered in public

1 Summary

- 1.1 This paper sets out the request for Programme and Project Authority for the continuation of the Surface Transport Asset Renewals Programme (the Programme) into the next two years, 2020/21 and 2021/22. The Programme maintains the safety, operability and reliability of highway, traffic, bus, coach and river assets through a prioritised programme of planned and reactive renewals.
- 1.2 The budget was substantially reduced in 2018/19 and 2019/20 as a consequence of the government removing TfL's revenue grant. The budget is returning to steady state levels by 2021/22. The Programme outputs and schedules reflect the increasing budget for 2020/21.
- 1.3 The purpose of this paper is to:
- (a) present the Programme's achievements since the previous submission;
 - (b) summarise the financial allocations by main asset types and projects for 2020/21 and the associated outputs; and
 - (c) update the Committee on the progress of the Programme.
- 1.4 The Programme will return annually to the Committee for authority approval.

Surface Transport Assets Renewals Programme					
	Existing Financial Authority (17/18 to 24/25)	Estimated Final Cost (17/18 to 24/25)	Existing Programme and Project Authority (17/18 to 21/22)	Additional Programme and Project Authority Requested (17/18 to 21/22)	Total Programme and Project Authority (17/18 to 21/22)
Gross	£1,092m	£1,102m	£307m	£311m	£618m
Income	£39m	£49m	£28m	£21m	£49m
Net	£1,053m	£1,053m	£279m	£290m	£569m

2 Recommendations

2.1 The Committee is asked to note the paper and:

- (a) approve additional Programme and Project Authority of £311m for delivery of the Surface Transport Assets Renewals Programme – including £8m in 2019/20, £122m in 2020/21 and £180m in 2021/22 as described in this paper; and**
- (b) note that Procurement Authority in respect of the various elements of the Surface Assets Programme will be sought at officer level in accordance with Standing Orders.**

3 Background

Strategic Context

- 3.1 The Mayor's Transport Strategy (MTS) puts transport at the heart of creating a city for all Londoners. The MTS has three key themes: healthy streets and healthy people; a good public transport experience; and new homes and jobs. TfL's Surface assets support all three of these themes, as almost all journeys on London's transport system start or finish on the road network.
- 3.2 The Programme had previously been supported by the revenue grant that TfL received from the government. This ceased in 2017/18 resulting in an overall reduction in government funding of £700m a year.

Surface Assets

- 3.3 The Surface assets covered by this paper include roads, footways, bus and coach stations, bus stops and shelters, river assets, Woolwich Ferry, traffic signals, bridges, tunnels, street lighting, drainage and trees. Appendix 1 provides a summary of the assets.
- 3.4 The Programme covers bus infrastructure and traffic signals on all London roads and highway assets on the Transport for London Road Network (TLRN). The TLRN is London's strategic road network – it is 580km long and carries over a third of all traffic. TfL is the statutory highway authority and traffic authority for the TLRN.
- 3.5 The Programme also covers Local Implementation Plan (LIP) funding for Borough principal road resurfacing and Borough bridge strengthening.

Asset duties and responsibilities

- 3.6 TfL, as the highway authority for the TLRN, has a statutory duty under the Highways Act 1980 to maintain the public highway. The Traffic Management Act 2004 places a duty on TfL to 'manage the road network with a view to securing and facilitating the expeditious movement of people and goods', which includes the provision and maintenance of assets (e.g. traffic signals) that support this activity. TfL also has additional statutory duties under the Road Tunnel Safety Act 2007 for the safe management and operation of road tunnels.

3.7 These duties are further explained and expanded upon through national and international industry standards and guidance. TfL applies a robust asset management approach to manage and control the application of these duties.

Supporting the Mayor's Transport Strategy

3.8 Maintaining and renewing assets is vital to the success of the MTS. Surface assets support:

(a) healthy streets and healthy people – maintaining assets in a good condition contributes to streets that are appealing and safe places to walk, cycle and spend time; and

(b) a good public transport experience – maintaining assets in a good condition supports a safe and reliable network that encourages customers to use public transport and to make walking and cycling their preferred choice.

3.9 We have reviewed our risk-based prioritisation process and State of Good Repair (SOGR) targets (described in the next section) to place greater priority on the walking, cycling and public networks. This includes:

(a) giving higher renewal priority to sections of carriageway that support high volumes of cyclists (hierarchy shown in Figure 1) and, in general, maintaining higher usage cycle routes in better condition than lower usage cycle routes (regardless of the volume of motor vehicles using the routes); and

(b) identifying opportunities to incorporate walking, cycling and public transport benefits into “standard” renewal schemes. For example, where the signals for a pedestrian crossing are to be renewed we will also consider the benefits of renewing the footway, carriageway, drainage etc. if this will improve the walking experience.

3.10 Appendix 2 lists the specific MTS policy statements that are supported by maintaining assets in a good condition.

Maintaining assets in a State of Good Repair

3.11 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 – each asset has a target SOGR range, examples are shown in Table 1.

Table 1: State of Good Repair ranges

Asset	SOGR target range (per cent)	
Carriageway*	High volume of cyclists	93 to 96
	Low volume of cyclists	90 to 93
Footway	91 to 96	
Bridges	88 to 92	
Street lighting	90 to 95	

* It will take several years for the difference to become apparent because the whole network is currently below 90 per cent SOGR due to the two year pause to renewals.

3.12 Details on how SOGR is measured and calculated are provided in Appendix 3.

Asset maintenance and asset renewals

3.13 An effective regime of asset maintenance and renewal minimises whole life costs while maximising the benefits provided by the assets.

3.14 This paper seeks approval for the capital and operating expenditure on asset renewals, however it is important to bear in mind that asset maintenance and renewals go hand-in-hand and changes to one directly influence the other.

Alignment with Healthy Streets

3.15 The relationship and difference between the Surface Assets Programme and the Healthy Streets Programme can be described as:

(a) Healthy Streets – enhances existing benefits and provides new benefits to customers, for example Cycleways; and

(b) Surface Assets – protects and maintains benefits and prevents them from being eroded over time – for example, maintaining the condition and ride quality on Cycleways.

3.16 The links and dependencies between the programmes are well understood, in particular, the role of the Surface Assets Programme to maintain benefits delivered by Healthy Streets. To maximise efficiencies and benefits the delivery of projects across both programmes are fully coordinated.

4 Programme Delivery in 2018/19 and 2019/20

Summary

- 4.1 The previous authority request was submitted to the Committee in October 2018 and covered 2017/18 delivery only. This submission captures the 2018/19 and 2019/20 delivery – the two years of reduced renewals investment.

Benefits and value

- 4.2 The total renewals expenditure across 2018/19 and 2019/20 was £130m – for comparison, typical steady state investment per annum prior to 2018/19 was circa £150m to £200m. Figure 1 shows the change in the SOGR for roads, footways and bridges and Table 2 shows the change in customer satisfaction scores.

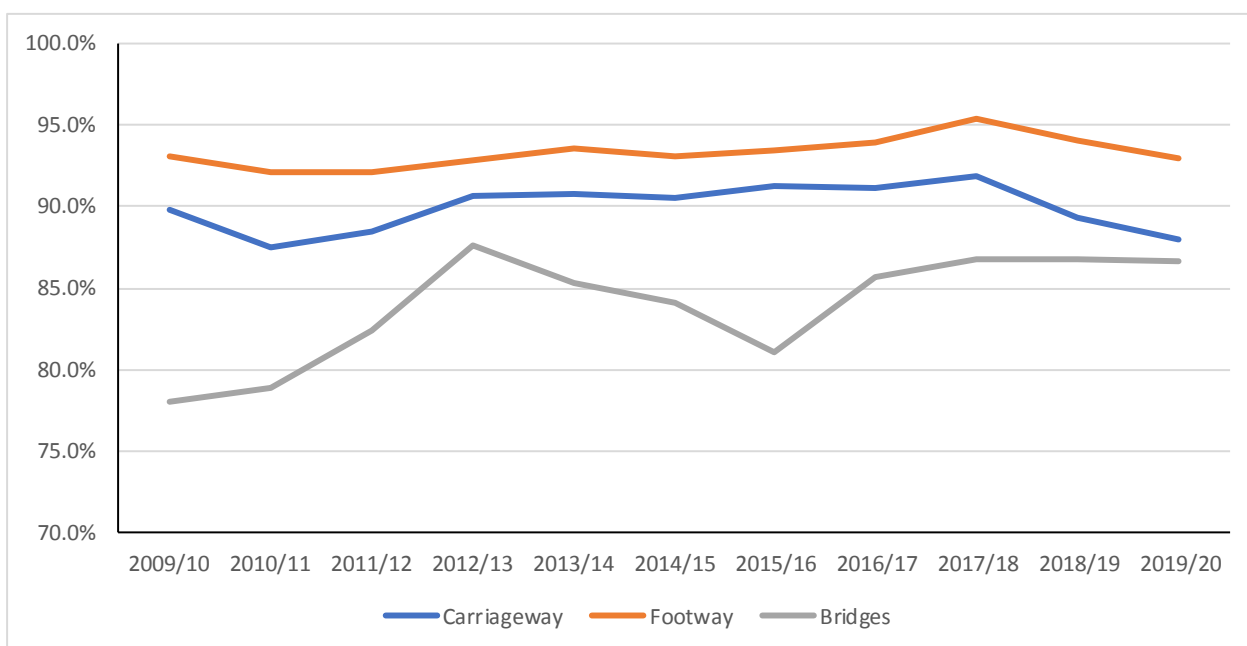


Figure 1: State of Good Repair (SOGR) trend

- 4.3 The pause in asset renewals for 2018/19 and 2019/20 has resulted in a decline in asset condition. The decline in carriageway and footway condition has been rapid, had 2018/19 and 2019/20 not been mild winters this decline would have been even more pronounced. As a comparator, the impact of the reduced investment in these two years had the same impact on condition as the severe winters of 2009/10 and 2010/11.
- 4.4 The profile for bridges has two significant SOGR fluctuations. In 2012/13 a marked improvement followed the completion of Hammersmith Flyover refurbishment. In 2015/16 a marked drop followed a detailed inspection of Brent Cross structures and Westway structures, initiating some immediate remedial works, followed by the completion of several large projects contributing to SOGR improvement in the following two years. The condition has been relatively steady state the last two years, however prior to the pause significant works had been planned for this period that would have improved the SOGR for bridges to around 88 per cent.

Table 2: 2017/18 Outcome measures

Customer Satisfaction measure	14/15	15/16	16/17	17/18	18/19	19/20
Carriageway condition - all users	72	65	66	66	67	67
Carriageway condition - cyclists	n/a	62	64	63	68	66
Cycle lane condition - cyclists	n/a	61	63	62	67	66
Footway condition	67	62	63	64	65	63
Traffic Signal condition	79	73	73	72	73	73
Bus stations	87	87	88	80	NA*	NA*

* Survey discontinued

- 4.5 There is a general downward trend in customer satisfaction scores for carriageway and footway. This reflects the associated reduction in SOGR shown in Figure 1, however it also reflects a London wide trend of declining highway condition – as described in the London Technical Advisors’ Group’s (LoTAG) annual report on London-wide road condition. It is highly likely that customers do not differentiate between TfL and borough roads when answering these questions. Therefore, even as TLRN condition improves due to the forward renewals programme, if the same does not occur on borough roads then customer satisfaction scores are likely to continue to decline.

Delivery in 2018/19 and 2019/20

- 4.6 Key outputs for 2018/19 and 2019/20 included:

- (a) Power Road Bridge – major road over rail renewal completed;
- (b) Bus driver facilities – new toilets provided for priority routes;
- (c) Greenwich Pier – renewal works completed; and
- (d) Hammersmith Bridge – investigations, feasibility and early works.

- 4.7 Table 3 provides a summary of the key Programme investment and outputs for 2018/19 and 2019/20.

Table 3: 2018/19 and 2019/20 actuals/forecast and outputs

Sub-programme	2018/19 actuals (£m)	2018/19 output	2019/20 forecast (£m)	2019/20 expected output
Carriageway	1.583	950m ² of network treated	21.838	425,000m ² of network treated
Drainage	1.252	1 design completed	0.0	No planned renewals
Footway	0.148	No planned renewals	0.135	No planned renewals
Lighting	0.084	No planned renewals	3.026	117 Columns and 4000 Luminaires replaced
Structures	0.458	No planned renewals	5.492	Five renewal schemes completed
Tunnels	1.120	19 renewal schemes completed	0.203	1 feasibility completed
Traffic Signal Modernisation	0.358	5 controllers renewed	5.454	20 controllers renewed
Pump Stations	0.181	4 renewal schemes completed	0.553	4 renewal schemes completed
Restraint Barriers	0.072	1 design completed	0.091	1 design completed
Bus Stations and Stands	0.472	3 renewal schemes completed	3.013	10 renewal schemes completed
Bus Stops and Shelters	0.392	No planned renewals	3.832	300 shelters renewed
Bus Driver Facilities	3.020	20 additional facilities completed	2.249	24 additional facilities completed
Coach Station/VCS	2.360	Ongoing works	1.905	Ongoing works
River Piers	0.059	No planned renewals	0.586	1 renewal scheme completed
Highbury Corner Bridge	0.473	New bridge in operation	0	No further works
Ardleigh Green Bridge	9.279	New bridge installed	1.026	Highway works complete
Upper Holloway Road Bridge	0.058	Project close out	0	No further works
Power Road Bridge	4.727	New bridge in operation	0.653	Project close completed
Major Asset Renewals preparation, e.g. Westway,	1.270	3 Feasibility and concept designs completed	2.590	3 Concept and detailed designs completed

Sub-programme	2018/19 actuals (£m)	2018/19 output	2019/20 forecast (£m)	2019/20 expected output
Rotherhithe				
Woolwich Ferry	14.748	Ferry re-opened	0.315	Project close completed
Borough roads	3.203	44,366m ²	3.00	44,00m ²
Borough bridges	6.875	1 renewal scheme completed	7.00	3 renewal schemes completed
Safety Cameras and CCTV	0.175	No planned renewals	1.738	40 renewal schemes completed
Green Estate	0.007	No planned renewals	0.314	1,084 additional trees planted
Minor Capital Interventions	5.764	99 schemes completed	8.743	132 schemes completed
Third Party	9.965*	Undefined	5.520*	Undefined
Other	2.897* ¹	Undefined	3.562* ¹	Undefined
Total	71.0		76.0	

*Borough and developer requested traffic signals works at various stages

*¹Includes staff costs – increasing in 2019/20 to reflecting the preparation for an increasing programme size in 2020/21

5 Programme Delivery for 2020/21

Option assessment

- 5.1 Business Planning considered the following strategic options:
- (a) Option 1: Continue renewals pause – extend the pause beyond two years until a sustainable long-term funding solution for roads has been secured. The network impacts caused by the two-year pause include vehicles restrictions on Rotherhithe Tunnel; speed restrictions on A40, interim measures on over 40 bridges, lighting removal on A2 and A12, and declining asset condition. Asset modelling shows the position will degrade if the investment pause continues, with a risk that several major bridges/tunnels across the Thames could be restricted at the same time. This option was discounted based on the high risk to network operability.
 - (b) Option 2: three to five year ramp up to required level – a slow return to the required investment levels will mean that most of the short-term investment is likely to be committed on several larger and critical projects, e.g. Rotherhithe Tunnel and the A40 Westway. This will mean other assets (e.g. carriageway, footway, drainage, lighting) will continue to decline, or at best stay at current levels, during this time. This option is discounted because it would be necessary to further defer interventions to deal with known asset risks to network operability and reliability.
 - (c) Option 3: Two year ramp up to required level (**recommended**) – returns investment to 70 per cent of required levels in 2020/21 and in full in 2021/22. Asset modelling indicates this will mitigate further decline in asset condition and, going forward, enable the accumulated renewals backlog to be addressed. Also, ramping up investment over two years provides a realistic delivery programme that takes account of remobilisation of internal and supply chain resources, and the feasibility/design lead times for projects.
 - (d) Option 4: One year ramp up to required level – this option immediately halts the decline in asset condition and starts to address the accumulated renewals backlog. However, the ability to switch from circa £70m in 2019/20 to £150m in 2020/21 is constrained by resources (internal and supply chain) and scheme readiness. This option is not recommended.
- 5.2 The figures and financials show in the remained of this paper relate to Option 3 which has been included in the TfL Business Plan and Budget.

Benefits and value

- 5.3 Asset models have been used to assess the SOGR that will be achieved by the Business Plan investment, these are shown in Table 4 compared to the 2018/19 and 2019/20 outcomes. This shows a gradual improvement in asset condition over the Business Plan period – based on removing the accumulated backlog and addressing needs as they arise. The predictions for carriageway and footway do not include severe winter weather events.

Table 4: Predicted State of Good Repair (per cent)

Asset	18/19	19/20	20/21	21/22	22/23	23/24	24/25
Carriageway Overall	89	88	87	88	89	90	91
Carriageway (High volume of cyclists)*	93	92	92	93	93	94	95
Carriageway (Low volume of cyclists)*	89	87	88	89	89	90	91
Footway	94	93	92	92	92	92	93
Structures	87	87	86	86	87	88	88

* Note that these figures are indicative and are expected to represent the condition of the nearside lane. Further development of specific performance indicators are underway.

Delivery in 2020/21

5.4 Key activities planned for 2020/21 include:

- (a) Rotherhithe tunnel – concept design work completed for tunnel refurbishment which will include a design for a new ventilation system and other tunnel systems (e.g. CCTV, PA);
- (b) A40 Westway – appointment of a contractor, design completed and commencement of construction work;
- (c) Kingston Cromwell Road bus station – contract awarded for full renewal of bus station to address safety and operational issues and improve customer experience;
- (d) Vauxhall Bridge – construction completed for waterproofing works;
- (e) Hammersmith Bridge – progress the design and delivery of a temporary bridge (subject to consents, final cost estimates and funding plan); and
- (f) Protective measures on bridges – feasibility and concept design for all TfL bridges complete.

5.5 A breakdown of the main projects and programmes that make up the overall Surface Transport Asset Renewals Programme is shown in Table 5. A more detailed breakdown of the allocation and associated outputs is provided in Appendix 4.

5.6 The budget for 2020/21 is £122m – the allocations and outputs shown in Table 5 and Appendix 4 are based on a prioritised programme of work that delivers to time and budget.

Table 5: Assets Programme – Constituent projects and programme and Project Authority requested from PIC

Activity	Description	Cumulative Authority Request £m					
		17/18	18/19	19/20	20/21	21/22	Total
Annualised renewals	Programme of annualised renewals to provide a safe, operable and reliable network – includes bus stations and shelters, carriageways, footways, bridges, tunnels, lighting and signals	73	14	48	79	63	277
Borough roads and bridges	Carriageway renewals on the Borough Principal Road Network (BPRN) and borough bridge strengthening, including TfL’s contribution to Hammersmith Bridge	26	10	10	21	40	107
Major Asset Renewals	A programme of major renewals on high priority risks. Inflight projects include Vauxhall Bridge, Rotherhithe Tunnel, the A40 Westway, Gallows Corner flyover and the Brent Cross Structures.	38	16	5	17	81	157
River schemes, coaches and operations	Includes safety camera replacement works and hostile vehicle mitigations measures. Also includes Woolwich Ferry, renewal/repair of Victoria Coach Station and river pier assets.	19	21	7	9	5	61
Over programming and value engineering	All projects are tasked with achieving Value Engineering savings which will be reinvested in the portfolio; and over-programming allows a portfolio management approach.	-	-	-	-15	-18	-33
Third party projects	Working with developers to safeguard and enable infrastructure improvements; the quantum varies and is netted off when incurred.	12	10	6	11	10	49
Total		168	71	76	122	181	618

Impact on Operations

- 5.7 The two-year reduction in asset renewals has placed substantial pressure on Asset Operations budgets and network operations. An increased number of temporary closures and interim measures were implemented on bridges and tunnels to keep the network safe. Table 6 sets out this impact.

Table 6: Interim Measures and Associated Costs

Year	Assets with Interim Measures	Annual Cost of Interim Measures	Cost of Reactive Safety works	Total Cost
2016/17	24	£451k	£115k	£566k
2017/18	26	£556k	£410k	£966k
2018/19	39	£702k	£1,369k	£2,071k
2019/20	43	£2,496k	£1,440k	£3,936k

- 5.8 Example of network impacts include:

- (a) Rotherhithe Tunnel – additional traffic restrictions put in place and only cars permitted;
- (b) A40 Westway – speed restriction (40mph to 30mph) and numerous short closures to implement reactive safety works (expansion joint repairs);
- (c) Vehicle Restraint System (VRS) – speed restriction (50mph to 40mph) implemented on A40 due to poor condition of VRS;
- (d) A2/A12 lighting removal – columns failed structural testing and were removed but not replaced;
- (e) Hammersmith Bridge – closure to all road traffic (pedestrians and cyclist permitted); and
- (f) Gallows Corner Flyover – speed restriction from 30mph to 20mph.

The proposed programme of renewals will, over time, reduce the burden on Asset Operation budgets and improve network operability and reliability.

6 Programme risks and milestones

Programme risks

6.1 The top risks associated with the Programme are shown below.

Table 7: Top risks from Surface Asset Renewals Programme

Risk No	Risk Description	Mitigation Actions
1	Deliverability – insufficient supply chain resource	<ul style="list-style-type: none"> The supply chain has been engaged and provided early access to the programme and outline funding allocations A significant number of work orders have been raised this year to progress design works so (i) works are ready to go in 2020/21 and (ii) the supply chain has the confidence to resource up for 2020/21.
2	Contract demobilisation	<ul style="list-style-type: none"> The existing highway maintenance contract, which delivers a significant proportion of the annualised renewals activities, comes to an end in March 2021. Close working and early planning of the programme with the supply chain is being used to mitigate the risk of demobilisation impacting delivery. Additional projects are being identified for assets delivered via other contracts (traffic signals and bus stops and shelters) to ensure delivery is still achieved.
3	Deliverability – insufficient internal resource	<ul style="list-style-type: none"> Vacancies that were held across 2018/19 and part of 2019/20 are now being recruited to in Sponsorship, Project Delivery and Engineering. Concerns remain in some areas and work is continuing to ensure key resources are in place to support delivery
4	Unable to gain necessary network access	<ul style="list-style-type: none"> A greater risk for 2021/22 – early planning 2020/21 of all major access requirements for 2021/22, e.g. A40 Westway and Rotherhithe Tunnel. The Programme will be flexed to accommodate the most beneficial access arrangements

6.2 The Programme does not include a top-level risk allowance. It is comprised of hundreds of schemes that, experience has shown, enable risk to be managed across the Programme using over-programming. On larger projects (for example, the A40 Westway and Rotherhithe Tunnel) risk is held at project level.

Programme milestones

6.3 The strategic milestones are shown in Table 8.

Table 8: Strategic Milestones

Project	Milestone	Tier	Target Date
Carriageway capital renewals	220,000 m ² resurfaced	1	March 2021
Hammersmith Bridge	Detailed design completed for a temporary bridge at Hammersmith	2	October 2020

Commercial Strategy

6.4 The Programme is delivered via several term maintenance contracts, and through individual contracts for larger/unique projects under the TfL Capital Projects Framework (CPF), for example Rotherhithe Tunnel, A40 Westway and Kingston Cromwell Road bus station. 2020/21 is the final year of the highway term maintenance contract and the CPF.

6.5 A commercial strategy will be developed in the coming months to determine how works are to be finalised post contract end date and/or handed over to another contractor. This will influence the type/quantum of works that can be designed by one contractor in 2020/21 and passed to a new contractor for delivery in 2021/22. There is also the option to mobilise the new contractors early so they get a head start on designs for 2021/22.

7 Financial Implications

7.1 In October 2018 the Committee approved Programme and Project Authority totalling £303m for the period 2017/18 to 2019/20. There have been a number of adjustments to the Programme since October 2018, as such the total existing Programme and Project Authority has increased to £307m. The adjustments result from the transfer of the following projects into the Programme, which have been approved by the Committee as detailed below:

- (a) Victoria Coach Station toilet refurbishment and Bus Driver toilet facilities transferred from the Public Transport Programme (£2m); and
- (b) Safety camera installation transferred from the Healthy Streets Programme (£2m).

- 7.2 Of this revised total Programme and Project Authority of £307m, £68m represents the Programme and Project Authority approved for 2019/20. Our current forecast is that £76m is required for delivery this year, with the £8m additional request relating to:
- (a) fully funded 3rd party schemes (£3m);
 - (b) measures to improve the operational reliability and resilience of the Woolwich Ferry, which was funded in the 2019/20 Budget (£2m); and
 - (c) recommencing proactive road renewals in the final quarter for 2019/20 to smooth the ramp-up in renewals in 2020/21 as the two-year asset renewal pause comes to an end (£3m). This is funded through underspends elsewhere in the Surface capital programme in 2019/20.
- 7.3 The 2020/21 TfL Budget, to be approved by the Board in March 2020, and 2019 TfL Business Plan provide the Financial Authority needed to deliver the scope of the works set out in this request, with the exception of £10m in 2021/22. This £10m relates to additional third party funded schemes, so there is no net impact on TfL funding. The necessary Financial Authority will be requested through the 2020 Business Planning process.
- 7.4 The request as it relates to the Programme's Financial Authority is shown in Table 9.

Table 9: Summary of the costs and funding

Assets Programme		Outturn		Forecast	Budget	2019 Business Plan				Total
Rounded to £m		17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	
Programme total	Total programme	168	71	76	122	180	181	150	154	1,102
	TfL Element	156	61	71	111	170	181	150	154	1,054
	Third Party Funding	12	10	6	11	10	-	-	-	49
Financial Authority	Total budget	168	71	76	122	170	181	150	154	1,092
	TfL Element	156	61	71	111	170	181	150	154	1,054
	Third Party Funding	12	10	6	11	-	-	-	-	39
Programme and Project Authority	Total request	169	70	76	122	180				618
	Existing authority	169	70	68						307
	This request			8	122	181				311
Future requests							181	150	154	484

Financial Authority will be revised in line with Programme and Project Authority when the Budget is approved by the Board in March 2020.

8 Health and safety

8.1 The safety of customers and workforce is our top priority. The asset management and project delivery practices we have in place, and their ongoing review, will ensure we continue to provide safe assets and delivery work on them safely.

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 and, as such, maintains the existing provisions. The assessment indicates that the lower SOGR may have a negative impact on two groups: older and disabled customers, therefore the programme to improve SOGR will benefit both these groups.

9.3 In instances where projects introduce a change to the network an equality impact assessment is completed.

9.4 All works that are undertaken are designed to minimise disruption to mobility impaired and visually impaired users, this includes:

- (a) access ramps where the footpath cannot be used to assist mobility impaired users change levels;
- (b) phasing works so most disruptive works are completed at night - where safe, practicable and permitted;
- (c) checking that alternative pedestrian routes are fully accessible; and
- (d) using traffic management personnel on sites to ensure no-one encroaches into the worksite, or to escort residents (including visually impaired) to their property through a worksite where this cannot be avoided – for example, a scheme on Kennington Park Road used this approach for a number of reasons including a mobility impaired resident with assistance.

10 Assurance

- 10.1 TfL Project Assurance conducted an Integrated Assurance Review (IAR) on the Programme in January 2020. An independent review was also undertaken by the Independent Investment Programme Advisory Group (IIPAG). There were five recommendations by the IAR, three by IIPAG and no critical issues identified through the review. 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 under the Programme Review. The IAP sets out those projects within the Programme that are expected to be reviewed in the next 12 months. The IAP will be reviewed and updated quarterly.

List of appendices to this paper:

- Appendix 1: Transport for London Assets
- Appendix 2: How assets support the Mayor's Transport Strategy
- Appendix 3: State of Good Repair
- Appendix 4: 2020/21 budget allocations and outputs
- Appendix 5: Costs estimation and risk

List of Background papers:

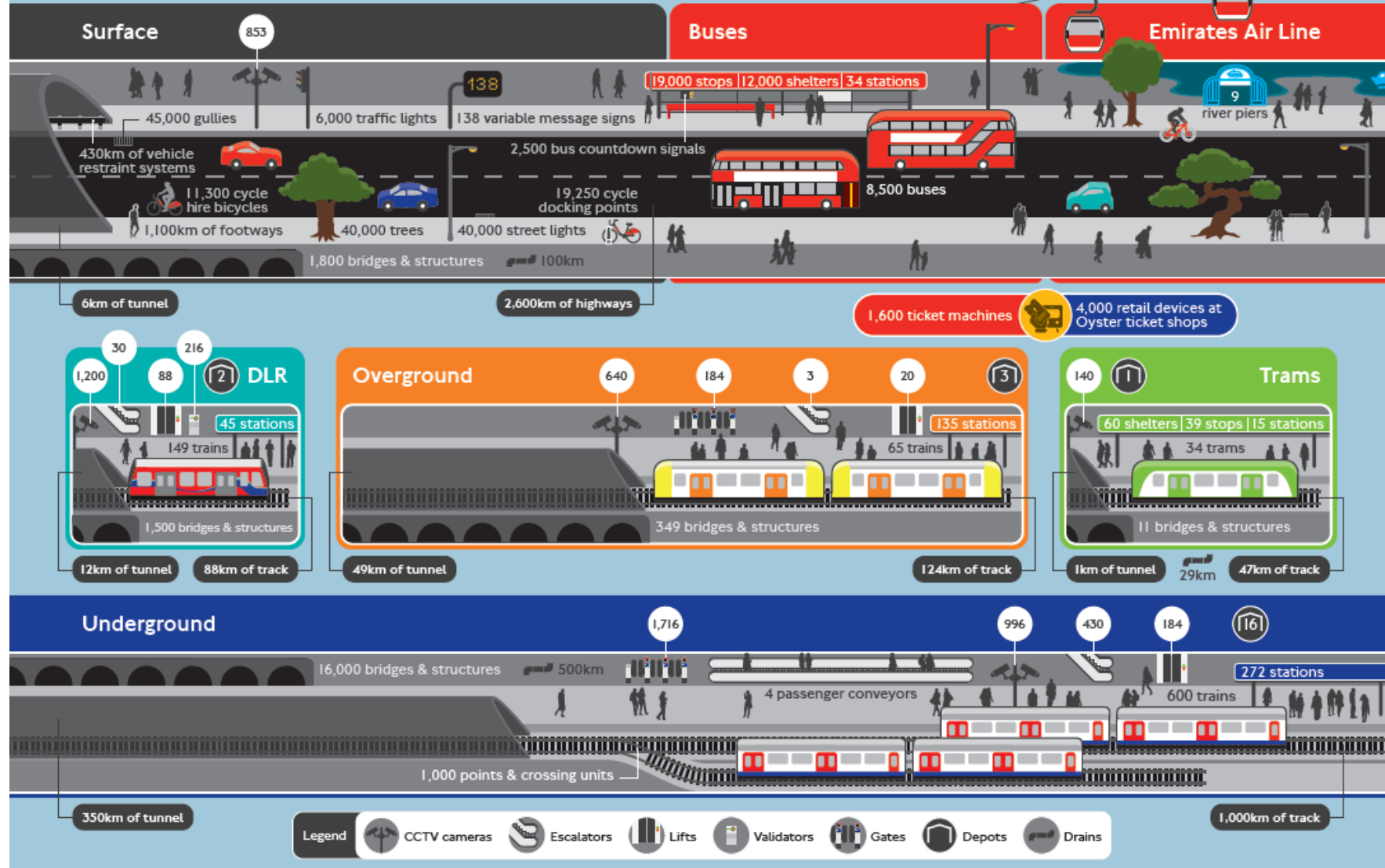
- London Technical Advisors Group (LoTAG): 2019 State of the City Report
- IIPAG and TfL Project Assurance Reports
- Management response to IIPAG and TfL Project Assurance Reports

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Appendix 1: Transport for London Assets

Transport for London's assets Keeping London moving



Asset	Quantity	Definition
Carriageway	580 km	The part of the highway primarily used by vehicular traffic and cyclists, except where the latter are restricted from use, for example, on high speed routes.
Footways	1,422 km	Those parts of the highway used by pedestrians and/or cyclists – a shared use footway is for cyclists and pedestrians and will be clearly signed.
Traffic signals	Over 6,000 (pan London)	Electrical equipment placed at interchanges (including pedestrian crossings, crossroads and large roundabouts) to manage the interaction between pedestrians and traffic.
Bridges and structures	Approximately 1,800	Any bridge or other structure within the footprint of the highway or that materially affects the support of the highway or land immediately adjacent to it.
Bus shelters	12,000 (pan London)	Small structures, typically on footway, that provide shelter for waiting bus passengers and information on local buses.
Bus stations	34 major stations	Stations dedicated to managing the boarding and alighting of buses. These may also include staff facilities, information and sales hubs, waiting areas and retail outlets.
Drainage gullies	Over 45,000	A system of gullies, drains and pumping stations that capture and transport water away from the carriageway and footway.
Street lighting	Over 40,000	Lighting specifically provided to illuminate the highway, the most common form being lamp posts, but also includes lighting attached to buildings, subway lighting and tunnel lighting.
Green estate	40,000 trees & over 700 acres of grass, woodland & verges	Trees, hedges, shrubs, grassed areas and verges associated with the red routes.

Asset	Quantity	Definition
Vehicle restraint systems	430 km	Installed on a road to provide a level of containment for an errant vehicle.
River piers	9	River piers dedicated to managing the boarding and alighting of river boats. These may also include staff facilities, information and waiting areas.
CCTV	853	Used across the network to monitor traffic and support network management.
Road tunnels	12	An enclosed length of 150 metres or more through which a road passes.
Boroughs	Roads and bridges	Through LIPs we fund Borough Principal Road resurfacing (over 1000km) and bridge strengthening, e.g. Hammersmith Bridge.

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Appendix 2: How assets support the Mayor’s Transport Strategy

MTS Policy Statements supported by assets	Relevant assets and impact on outcomes
Policy 1 - Make London a city where people choose to walk and cycle more often by improving street environments, making it easier for everyone to get around on foot and by bike	Carriageway, cycle routes and footways – the increasing number of defects and reduced condition on roads and footways may discourage walking and cycling, and may act as a barrier to new cyclists
Policy 2 - Adopt Vision Zero for road danger in London	Carriageway and cycle routes – with more defects and a generally reduced condition there is an increased likelihood that asset condition may be a contributory factor in accidents and injuries
Policy 3 - Ensure that crime and the fear of crime remain low on London’s streets and transport system	Street lighting, bus shelters and bus stations – lights out, poorer condition bus shelters and a “run down” feel to bus stations may create a “broken window” feel on parts of the network
Policy 8 - Ensure that London’s transport is resilient to the impacts of severe weather and climate change	Carriageway and highway drainage – carriageway in poorer condition will deteriorate more rapidly in severe winter (freezing-thawing) conditions, and more highway flooding as there are no regular drainage renewals to deal with failed and substandard pipes
Policy 12 – Enhance London’s streets and public transport network so as to enable all Londoners, including disabled and older people, to travel spontaneously and independently, making the transport system navigable and accessible to all.	Carriageway, cycle routes and footways – as per impact on Policy 1 above, also, the reduced condition of the footway may become a barrier to some less able users as they require a higher State of Good Repair to support movement
Policy 13 - Transform the quality of bus services so that they offer faster, more reliable, accessible, comfortable and convenient travel by public transport	Traffic signals, bus stations, shelters and stops – reduced condition of traffic signals will lead to more outages which will impact bus reliability, and reduced condition of bus stations, shelters and stops will reduce the quality of the customer experience

MTS Policy Statements supported by assets	Relevant assets and impact on outcomes
<p>Policy 15- Use of the full potential of the Thames to carry passengers, to integrate river services with the public transport system, walking and cycling networks.</p>	<p>River piers – a reduced programme of renewals may require piers to be restricted or taken out of use to maintain passenger safety. This can mean piers being out of service for extended periods if dry-docking is required to undertake the repairs.</p>

Appendix 3: State of Good Repair

SOGR, where possible, is based on industry standard condition measures – however, these are not consistent across asset types, for example the standard that describes the condition of a bridge is different to the condition survey for carriageways. 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:

- (a) 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.
- (b) Not in a SOGR – the sum of the percentages in the Poor and Very Poor categories. Typically these assets should be considered for a renewal within the next one to three year period.

The target range differs by asset type, Table 1 provides some examples.

Table 1: State of Good Repair ranges

Asset	SOGR target range (per cent)
Carriageway (High volume of cyclists)	93 to 96
Carriageway (Low volume of cyclists)	90 to 93
Footway	91 to 96
Bridges	88 to 92
Street lighting	90 to 95

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.

Target are not set as 100 – the upper bounds of the target ranges are set using customer expectations (based on customer surveys) and whole life costs. The latter has shown that is it uneconomical and provides poor value for money to deliver a SOGR above the upper bounds of these ranges – plus, that face-to-face surveys with customers have illustrated that they do not expect a “perfect” asset, they accept that at time repairs are required.

Therefore, a carriageway SOGR of 88 means 88 per cent (or 510km) is not in need of renewal based on the latest condition data, however the remaining 12 per cent (or 77km) should be considered for renewal. There is not an immediate safety concern or need for an urgent intervention, however based on an overall assessment of safety, reliability, whole life costs, customer satisfaction and future performance, these parts of the network should be considered and planned for renewal in the coming years.

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Appendix 4: 2020/21 budget allocations and outputs

Sub-programme	2020/21 allocation (£m)	2020/21 output
Minor Capital Interventions (MCI)	3.0	65 schemes completed
Carriageways	18.5	220,000m ² of network treated
Footways	2.2	12,000m ² of network treated
Lighting	4.0	800 Columns and 900 Luminaires replaced
Vehicle Restraint System (VRS)	1.1	1 detailed design completed
Drainage	1.1	120,000m ² network treated
Street Furniture	0.0	No planned renewals
Landscaping	0.2	600 trees planted
Structures	8.7	10 renewal schemes delivered
River Piers	0.5	2 feasibility studies/designs completed
Pumping Station	0.2	1 feasibility study/design completed
Tunnels	0.2	3 feasibility studies/designs completed
CCTV	0.0	No planned renewals
OVD/VMS	0.0	No planned renewals
TfL Traffic Signals	2.2	20 controllers renewed
Borough Traffic Signals	6.0	60 controllers renewed
Bus Stations & Stands	3.3	14 renewal schemes completed
Kingston Station	3.0	Construction to commence
Bus Stops & Shelters	3.8	350 shelters treated
Surface Asset Management Information Systems (SAMIS)	7.0	Minimum viable product completed
Highways Contracts Re-let	2.2	Contract awarded
Ardleigh Green Bridge Replacement	1.3	Final bridge works (rail side) completed
A40 Westway Structures Refurb	5.7	Commencement of construction
Vauxhall Bridge	2.0	Completion of waterproofing
Rotherhithe Tunnel	5.4	Concept design completed
Brent Cross structures	0.5	Investigations commenced
Modernised Victoria Coach Station	1.1	Single option selected
Hostile Vehicle Mitigations	1.0	Feasibility and concept designs completed
Safety Camera Extension Prog phase 2	1.5	Single option selected
VCS Infrastructure	1.0	2 schemes completed
Woolwich Ferry Life extension	1.1	Construction completed

Sub-programme	2020/21 allocation (£m)	2020/21 output
Phase 3		
Borough roads	3.5	80,000m ² of network area treated
Borough bridges	3.5	2 schemes completed
Hammersmith bridge	15.1	Temporary bridge detailed design complete
Third Party	11.0*	Undefined
A10 Speed Cameras	1.5	Construction completed
Total	122.3	

*Borough and developer requested traffic signals works at various stages

Appendix 5: Cost estimation and risk

Cost estimates are based on an assessment of the project requirements and data collected from past delivery, with appropriate risk allowances and optimism bias. For example, for standard renewal schemes the average unit rates are derived from an assessment of past delivery, e.g. the cost to renew carriageway per m², or the average cost of a signal modernisation.

Project specific cost estimating and risk assessment exercises are undertaken for the larger and more unique projects, for example Kingston Cromwell Road bus station, Rotherhithe Tunnel, Hammersmith bridge and the A40 Westway. Recent experience on these types of projects and other civil works has helped to build experience and a database of costs which are used to inform project estimates.

There is not a strategic risk budget for the Programme. All risks will be held at the project or sub-programme level and, in accordance with agreed arrangements, will be considered for drawdown at Project Board or Programme Board level depending on value. The exception is the Asset Capital Renewals sub-programme. This sub-programme, and the projects within it, will not have risk budgets; instead risks will be managed within the overall sub-programme allocation which is made possible by the sub-programme being comprised of around 1,000 individual projects.

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Programmes and Investment Committee



Date: 5 March 2020

Title: Public Transport Programme, 2020/21-2022/23

This paper will be considered in public

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) into the next three financial years, from 2020/21 to 2022/23. It is the third annual submission of the Programme to the Committee.
- 1.2 The focus of this paper is to:
- (a) present the Programme’s achievements since the previous submission in December 2018;
 - (b) summarise the delivery planned in the period 2020/21 to 2022/23; and
 - (c) update the Committee on the progress of the Programme.
- 1.3 The Programme will return annually to the Committee for authority approval.

Public Transport Programme					
2017/18 to 2022/23	Existing Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Authority
Gross	£573m	£573m	£289m	£99m	£387m
Income	£21m	£21m	£29m	-£7m	£21m
Net	£552m	£552m	£260m	£106m	£366m

2 Recommendation

- 2.1 The Committee is asked to note the paper and:
- (a) approve additional budgeted Programme and Project Authority of £99m, giving a total of £387m for the continuation of the Public Transport Programme;
 - (b) approve the transfer of projects and related authorities between the programmes set out below, which transfers are reflected in the authorities sought in this paper:
 - (i) the Public Transport Programme includes the Rotherhithe to Canary Wharf river crossing which transfers from the Healthy Streets Programme with nil Programme and Project Authority, noting that a

request for new Programme and Project Authority of £5m is included in the sums in paragraph 2.1(a) above;

(ii) the Public Transport Programme excludes the Victoria Coach Station toilet refurbishment and Bus Driver toilet facilities project which transfer to the Surface Assets Programme with Programme and Project Authority of £9m; and

(iii) the Public Transport Programme excludes the projects for Dial-a-Ride online registration, Cycle Hire payment system and Emirates Air Line communications which transfer to the Surface Technology Programme with Programme and Project Authority of £24m.

(c) note that Procurement Authority for matters within this programme will be sought at officer level in accordance with Standing Orders; and

(d) note that Financial Authority for 2020/21 will be granted in the TfL 2020/21 Budget, to be approved by the Board in March 2020.

3 Background

3.1 Programme delivery in 2019/20 has been strong. This has included bridge replacements at Blackhorse Lane and station upgrades at West Hampstead and White Hart Lane. We have worked closely with the Office of Rail and Road (ORR) to ensure it remained satisfied with our progress as we completed several workstreams in the Sandilands area. The victims and all others affected by the Croydon tram overturning incident remain in our thoughts. New projects have started as part of the Bus Safety Standard programme. Underlying this has been consistent delivery of our asset renewals.

3.2 All Surface public transport modes are within the scope of the Programme. These are the Docklands Light Railway (DLR), London Overground, London Trams, London River Services, Emirates Air Line, Cycle Hire, London Buses and Dial-a-Ride. London River Services, Emirates Air Line and Cycle Hire are subsequently referred to in this paper under the collective title of Sponsored Services.

3.3 The Programme, through the coordinated and prioritised delivery of capital projects, maintains and promotes a safe, operable and reliable public transport service. The Programme also undertakes the capacity enhancements and other improvements required across stations, vehicle fleets and other services to meet current and forecast demand for public transport and to support housing growth.

3.4 The Rotherhithe to Canary Wharf river crossing project (covered further in Table 1 and Table 3) transfers into the Programme from the Healthy Streets Programme. The new option under consideration, a ferry, would form part of the London River Services.

Programme objectives

3.5 Programme-level objectives were established in 2018 to align with the Mayor's Transport Strategy (MTS) to ensure strategic alignment downstream within the Programme's constituent projects. These objectives were reflected in the composition of the Programme at that time, which was primarily rail and bus

projects. They aligned the Programme with two of the three central themes of the MTS: A Good Public Transport Experience and New Homes and Jobs.

3.6 In 2019, the Programme's objectives were expanded to incorporate the third central theme of the MTS: Healthy Streets and Healthy People.

3.7 The Programme's objectives have therefore been updated to:

(a) define and deliver capital projects across Surface public transport modes to:

(i) meet the required levels of safety, operability, reliability and accessibility (in accordance with statutory and other obligations);

(ii) provide a good experience for current and prospective customers;

(iii) support current and forecast increases in customer demand (in alignment with strategic priorities);

(iv) meet and facilitate London's development (in alignment with strategic priorities);

(v) encourage walking and cycling; and

(b) ensure that value for money is achieved in the creation, acquisition, utilisation and maintenance of assets delivered through the Programme.

Programme composition

3.8 The Programme comprises three delivery elements:

(a) Rail and Sponsored Services Renewals;

(b) Rail and Sponsored Services Enhancements; and

(c) Bus Renewals and Enhancements.

3.9 The Programme is part of TfL's wider investment in these Surface public transport modes. Other investment, which reports separately to the Committee, includes:

(a) DLR Rolling Stock Replacement;

(b) London Overground Barking Riverside Extension; and

(c) projects within the London Bus portfolio delivered through other TfL Programmes such as Air Quality, Surface Assets and Surface Technology.

4 Programme Delivery in 2019/20

Previous submission

4.1 In December 2018 the Committee approved additional Programme and Project Authority of £89m giving a total of £347m for the period 2017/18 to 2021/22. There have been a number of adjustments to the Programme since December 2018 such that total existing Programme and Project Authority reduces to £289m

as a result of the closeout of legacy projects and the transfer of the following projects out of the Programme, as approved by the Committee:

- (a) Victoria Coach Station toilet refurbishment and Bus Driver toilet facilities transferred to the Surface Assets Programme; and
- (b) Dial-a-Ride online registration, Cycle Hire payment system and Emirates Air Line communications transferred to the Surface Technology Programme.

- 4.2 Of this revised total Programme and Project Authority of £289m, £86m represents the Programme and Project Authority approved for 2019/20. Our current forecast is that £100m is required for delivery of the Programme in this year. This delta is reflected in the request set out in this paper and is covered by an equivalent underspend to approved Programme and Project Authority in 2018/19.
- 4.3 Table 1 contains a summary of the Programme's successful delivery progress throughout 2019/20 by delivery element and mode.
- 4.4 While there has been some slippage to the timescales to sign third-party funding agreements for certain projects, this has been offset by strong delivery elsewhere in the Programme. Significant works have been accelerated within Rail and Sponsored Services Renewals, particularly on the London Trams network, which includes replacement of the Blackhorse Lane bridges.

Lessons learnt to inform future delivery

- 4.5 The November 2018 assurance review of the Programme (referred to in paragraph 5.4) recommended a lessons learnt review to "devise improvements to future procurements". This followed cost escalations on some rail projects within the Programme as a result of commercial claims.
- 4.6 A key output of this lessons learnt review has been the development of a procurement framework contract to support future rail project delivery. Activities are now underway to establish and award this framework, which is planned to be in place by the end of 2020. By providing visibility of the future project pipeline, among other measures, the procurement framework intends to encourage more collaborative working with the supply chain.
- 4.7 To provide this visibility, we have improved project pipeline development and oversight. Improving pan-TfL collaboration at the early project stages better informs project objectives and requirements, as well as improving our cost and resource estimates. As a result of this improved approach, we are now better able to identify assumptions and constraints with third-party funding opportunities and adjust our forecasting.

Table 1: Summary of Delivery Progress (selected projects)

Element	Description	DLR	London Overground	London Trams	Sponsored Services
Rail and Sponsored Services Renewals	Ensure that assets and services remain safe, operable and reliable.	Replaced electrical switchgear at Stratford Market depot, which is used both to de-energise equipment to allow work to be done and to clear faults downstream. Replaced the public address system at five stations. Converted the lighting system at Poplar station to LED.	Renewed station canopies and stairs along the West Anglia route. Improved passenger waiting facilities at Brockley station to address overcrowding and dwell time concerns. Completed phase one of the Asset Management Information System (AMIS) replacement.	Replaced and reopened the Blackhorse Lane bridges and renewed the waterproofing of the Addiscombe Road bridge deck. Undertook track and fleet renewals and replaced the retaining wall at Ampere Way. Updated the communications network to the latest standards.	Delivered a rolling programme of bike replacement and docking station infrastructure repairs. Replaced wide-based bollards at Santander docking stations in the London Borough of Westminster. Renewed the Emirates Air Line cableway.
Rail and Sponsored Services Enhancements	Meet and support growth in demand for travel by planning and delivering capacity, service, accessibility and other improvements.	Completed most of the remaining project scope to improve capacity at Custom House station, including complex high-voltage power works. Let design contracts for the first two projects within the Royal Docks Station Upgrades programme:	Constructed and opened a new station entrance and concourse at West Hampstead and new station buildings at White Hart Lane. These upgrades improved capacity and step free access. Installed a train protection warning system between Richmond	Completed a number of workstreams in the Sandilands area to address the Rail Accident Investigation Branch recommendations, including implementing an over-speed prevention system, which will automatically apply the brakes and bring a moving tram to a	In June 2019 the Committee endorsed pausing development of a bridge solution due to affordability, and for TfL to explore the feasibility of the alternative ferry option. Work is ongoing in support of a ferry as the revised preferred option for this river crossing with preliminary analysis having been undertaken on the scope of the ferry service, considering:

		Beckton Park and Royal Victoria. This programme is part of a wider portfolio to develop London's Royal Docks Enterprise Zone.	and Gunnersbury stations to enable future running of the new Class 710 rolling stock on the North London Line.	controlled stop if it exceeds the speed limit at designated locations; this system is now in operation on all 35 trams.	(a) fares; (b) pier locations; (c) the type of vessels to be used; and (d) potential service patterns.
Bus Renewals and Enhancements	Provide a safe, operable, reliable and accessible bus and Dial-a-Ride fleet to support Vision Zero and the MTS ambition for a growing, healthy London with reduced car dependency.	Bus Enhancements			
		Started retrofit of measures identified in the Bus Safety Standard programme; Intelligent Speed Assistance (ISA), which prevents vehicles exceeding the local speed limit, has been fitted to over a thousand Volvo buses, and blind spot mirrors have been fitted to over half of the London fleet. Implemented a New Routemaster revenue protection initiative, which allows bus drivers to open the front door without having to also open the middle and rear doors. Commenced trials of Demand Responsive Bus (DRB) services in Sutton and Ealing, which change routing and scheduling depending on demand.			

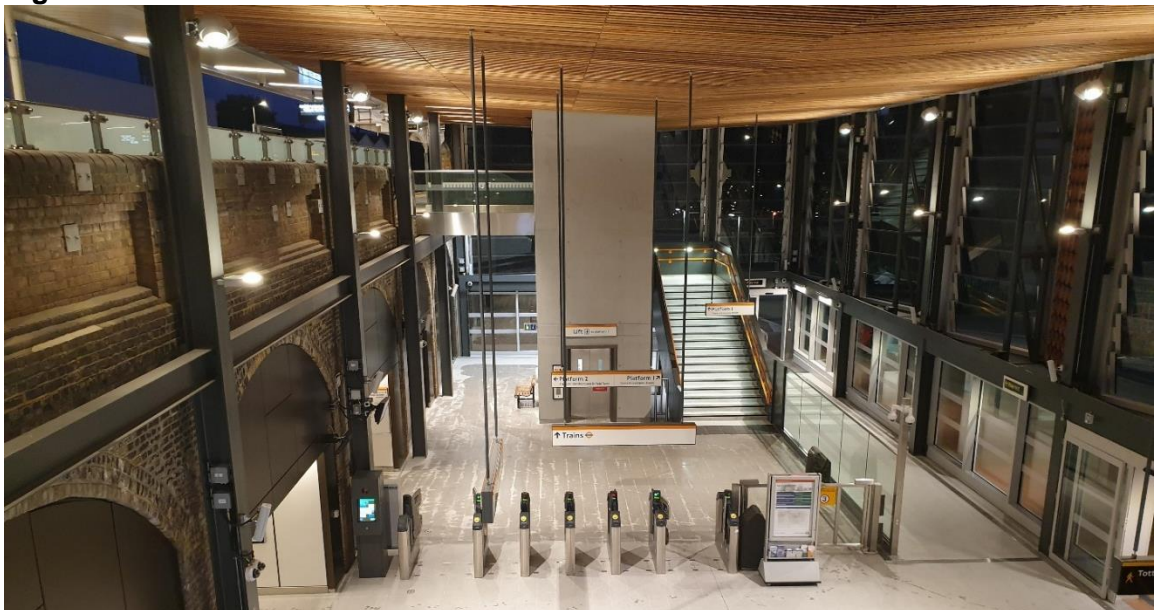
Figure 1 Blackhorse Lane bridge prior to reopening to the public in December 2019



Figure 2 Exterior view of the new entrance at West Hampstead station



Figure 3 The interior view of the new ticket hall at White Hart Lane station



5 Programme Proposal for 2020/21 to 2022/23

- 5.1 This submission seeks additional Programme and Project Authority of £99m giving a total of £387m for the period 2017/18 to 2022/23 for continuation of the Programme. Table 2 sets out the request, with further detail in Table 3 and Appendix 1.
- 5.2 The delivery approach for Rail and Sponsored Services Renewals, whereby a live prioritised workbank is kept under development, provides the Programme with the flexibility to accelerate delivery should funding opportunities emerge and respond to project slippage events, as evidenced in paragraph 4.4.
- 5.3 For the period 2020/21 to 2022/23, an increasing share of expenditure on Rail and Sponsored Services Enhancements will be funded by third parties. This reflects a number of successful TfL bids for funding, including to the Housing Infrastructure Fund (HIF) (referred to in section 6); the Royal Docks Enterprise Zone; and the Department for Transport's Access for All (AFA) fund. Some of the projects in Table 3 are subject to entering into the associated funding agreements.

Assurance recommendations

- 5.4 The TfL Project Assurance team conducted an assurance review of the Programme in November 2018. This review was supported by members of the Independent Investment Programme Advisory Group (IIPAG). The review identified no critical issues and made seven recommendations, all of which were accepted and closed out.
- 5.5 The TfL Project Assurance team conducted a further assurance review of the Programme in January 2020. IIPAG, following an assessment of the Programme, advised that they did not need to be involved in this review. The review identified no critical issues and made four recommendations. The Programme accepts all four recommendations and is developing a plan to address these. The output of this assurance review is covered in the background papers to this submission.

6 London Overground East London Line HIF Programme

- 6.1 The GLA, working with TfL, submitted a bid to the HIF in December 2018 for the East London Line. In August 2019 the Ministry of Housing, Communities and Local Government (MHCLG) approved this bid, which includes:
- (a) a full contribution to construct a new station at Surrey Canal Road and a majority contribution to construct a new entrance at Surrey Quays station; and
 - (b) a full contribution to undertake power and stabling works to enable a future train service uplift to 20 trains per hour on the East London Line core;
- 6.2 This is the second successful HIF bid involving the Programme. The other, for the DLR, includes a partial funding contribution to construct a new station at Thameside West. Upon conclusion of the funding agreement negotiations between TfL, the GLA and MHCLG, separate requests will be submitted to the Committee for these HIF programmes for TfL to enter into the HIF contracts and to request the associated Authorities, including Programme and Project Authority.

1.1 Pending review of the continuing progress of the funding agreement negotiations, limited forward funding may be requested from within TfL to maintain programme development and improve cost estimating certainty. This expenditure would be recoverable upon TfL entering into the HIF funding agreements with MHCLG. Forward funding would not be recoverable should TfL not enter into the HIF funding agreement with MHCLG, so it would be limited to activities that would not represent abortive expenditure in this scenario.

Table 2: Programme and Project Authority Request (presented to the nearest £m)

			Programme and Project Authority								
Programme	Description	Financial Authority	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Total Authority	Existing Authority	This Request
Rail and Sponsored Services Renewals	Docklands Light Railway	157	18	18	20	34	6	8	104	65	39
	London Overground	68	10	5	14	16	2	2	50	40	10
			Plus Third Party:		0	0	1	0			
	London Trams	85	7	14	18	17	6	4	68	26	43
			Plus Third Party:		3	0	0	0			
Sponsored Services	32	2	3	4	8	2	1	20	8	12	
Sub-Total		Gross	38	39	60	74	16	16	243	139	103
Rail and Sponsored Services Enhancements	Docklands Light Railway	36	7	16	4	29	1	0	57	20	37
			Plus Third Party:		0	0	0	0			
	London Overground	106	43	4	22	10	1	0	86	93	-7
			Plus Third Party:		3	2	1	0			
	London Trams	26	3	5	10	4	3	1	26	29	-3
	Sponsored Services	76	9	-1	1	4	0	0	14	10	3
Plus Third Party:			0	0	0	0					
Rail Station Works	27	0	1	-1	1	0	0	2	4	-3	
Sub-Total		Gross	63	25	40	50	6	1	184	158	27
Bus Projects	Bus Renewals & Enhancements	25	0	2	3	4	10	5	25	11	14
Other	Over Programming	-64	0	0	-3	-34	-14	-14	-64	-19	-45
TOTAL	Gross	573	101	65	100	95	18	8	387	289	99

Notes

1. The third-party contributions identified in Table 2 above reflect the income accounted for within the Programme in the 2020/21 TfL Budget and the 2019 TfL Business Plan. Further income of £4m associated with the DLR Royal Docks Station Upgrades programme is accounted for centrally within TfL.
2. Expenditure (and associated third-party contributions) for the successful DLR and East London Line HIF bids are not reflected in Table 2. Requests will be submitted separately to the Committee upon the conclusion of funding agreement negotiations. See section 6 for further details.

Table 3: Summary of Delivery Proposal (Selected Projects)

Element	Description	DLR	London Overground	London Trams	Sponsored Services
Rail and Sponsored Services Renewals	Ensure that assets and services remain safe, operable and reliable.	Reconfigure the high voltage distribution to remove a single point of failure. Replace the current ticket vending machines. Continue the rolling programmes of renewals on track, civils, switchgear, lifts and escalators, lighting and low voltage supplies, and mitigate end of life issues on the rolling stock.	Complete a kilometre of track re-railing in the Thames Tunnel. Refurbish priority stations and overhaul lifts. Implement phase two of the AMIS replacement; this involves data migration from the existing system to provide the new platform for London Overground assets.	Begin development of the Future Trams programme, which has been established to replace all 24 of the older CR4000 stock trams. Renew key sections of track at Love Lane and Reeves Corner. Strengthen the Birkbeck retaining wall and replace electrical switchgear at Oaks Road substation.	Start the 10-year refresh of the Cycle Hire fleet. Relocate cycle stations to support developments and demand management measures and continue to improve the mobile application. Deliver post-implementation works to improve resilience on the Woolwich Ferry.
Rail and Sponsored Services Enhancements	Meet and support growth in demand for travel by planning and delivering capacity, service, accessibility and other improvements.	Continue to progress the Royal Docks Station Upgrades programme, including starting on-site at Beckton Park and Royal Victoria stations to deliver congestion relief and customer experience improvements. (The DLR HIF programme will be the subject of a separate paper to the Committee).	Upgrade signalling to enable an increase in train frequency from 16 to 18 trains per hour during peak times between Dalston Junction and Surrey Quays stations. Continue works to deliver step free access at Brondesbury, Hackney Downs and Seven Sisters stations. (The East London Line HIF	Deliver the first Croydon Capacity Uplift schemes: customer and operational improvement works at East Croydon tram stop. Subject to adjacent developer timescales, begin delivery of congestion-relief and accessibility works at Wellesley Road tram stop.	Complete the initial concept designs for the Rotherhithe to Canary Wharf ferry in April 2020, which will enable the next stages of public consultation, preparation of planning/consents applications, and the main procurement(s) for the design, build, operation and maintenance of the service later in 2020,

			programme will be the subject of a separate paper to the Committee).		subject to the outcome of the consultation process.
Bus Renewals and Enhancements	Provide a safe, operable, reliable and accessible bus and Dial-a-Ride fleet to support Vision Zero and the MTS ambition for a growing, healthy London with reduced car dependency.	Bus Renewals	Bus Enhancements		
		Complete procurement to refurbish all 1,000 New Routemasters, which will all have reached the mid-point of their operational lives by 2024.	Complete the rollout of the retrofit of ISA on compatible Volvo buses. Begin the retrofit of non-Volvo buses, with over 1,000 buses forecast to have ISA fitted by March 2021. Agree the commercial strategy and start engagement with the market for the trial of an Advanced Emergency Braking (AEB) system, which will automatically apply the brakes if an imminent collision is detected. The trial will seek to stimulate bus manufacturers to develop AEB systems in advance of TfL's Bus Safety Standard programme commitment to mandate AEB on all new buses in London from 2024. Following completion of the Sutton and Ealing DRB trials, undertake a review of the results and publish reports.		

7 Equalities Implications

7.1 Due regard is had to the equalities impacts of all projects under the Programme on a case by case basis in accordance with TfL's obligations under the public sector equality duty in the Equality Act 2010.

8 Financial Implications

8.1 The 2020/21 TfL Budget and 2019 TfL Business Plan provide the Financial Authority needed to deliver the scope of the works set out in this request. (The Financial Authority is provided in the 2020/21 TfL Budget to be approved by the Board in March 2020). The request as it relates to the Programme's Financial Authority is shown in Table 4.

Table 4: Public Transport Authority Overview

Public Transport Programme (£m)		Outturn		Latest Forecast	2020/21 TfL Budget	2019 TfL Business Plan		Total
		2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
Programme Total		101	65	102	129	107	133	638
Over-Programming		0	0	-3	-34	-14	-14	-64
Financial Authority	Total Budget	101	65	100	95	93	119	573
	TfL Funding	96	62	92	92	91	119	552
	Third Party	6	3	8	3	2	0	21
Programme and Project Authority								
Programme and Project Authority	Total Request	101	65	100	95	18	8	387
	Existing Authority	101	80	86	21	0	0	289
	This Request	0	-14	14	74	18	8	99
Future Requests		0	0	0	0	74	112	186

List of Appendices:

Appendix 1: List of Projects included within this Submission

List of Background Papers:

Project Assurance Report
 Management Response to Project Assurance Report

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Number: 07725 609161
Email: AlexandraBatey@tfl.gov.uk

Appendix 1: List of Projects included within this Submission

Delivery Element	Projects Include
Rail and Sponsored Services Renewals	<ul style="list-style-type: none"> • Cycle Hire Infrastructure Renewals • DLR Infrastructure Renewals • DLR Ticket Vending Machine Replacement • Emirates Air Line Infrastructure Renewals • London Overground Infrastructure Renewals • London Overground West Anglia Renewals • London Trams Blackhorse Lane Bridge Replacement • London Trams Future Trams Programme • London Trams Infrastructure Renewals • London Trams Systems Integration • Woolwich Ferry & River Piers Infrastructure Renewals
Rail and Sponsored Services Enhancements – Docklands Light Railway	<ul style="list-style-type: none"> • CGL Rail Capitalisation • Custom House Station Capacity Upgrade • Customer Experience Enhancements Programme • Royal Docks Station Upgrades Programme
Rail and Sponsored Services Enhancements – London Overground	<ul style="list-style-type: none"> • Customer Journey Modernisation • East London Line Signalling Upgrade • Hackney Downs Station Upgrade • New Brondesbury Station Lifts (AFA) • New Seven Sisters Lifts (AFA) • Train Protection Warning System Upgrade • West Hampstead Station Capacity Upgrade • White Hart Lane Station Capacity Upgrade
Rail and Sponsored Services Enhancements – London Trams	<ul style="list-style-type: none"> • Croydon Capacity Uplift Programme • Elmers End Phase 1 (Land & Consents) • Sandilands Upgrades • Tramtrack Projects & Assets
Rail and Sponsored Services Enhancements – Sponsored Services	<ul style="list-style-type: none"> • Rotherhithe to Canary Wharf Ferry
Rail and Sponsored Services Enhancements – Rail Station Works	<ul style="list-style-type: none"> • Enhancements Pipeline Development
Bus Renewals and Enhancements	<ul style="list-style-type: none"> • Bus Safety Standard Programme • Demand Responsive Bus Trial

	<ul style="list-style-type: none">• New Routemaster Battery Replacement• New Routemaster Refurbishment• New Routemaster Revenue Protection
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Programmes and Investment Committee



Date: 5 March 2020

Item: Technology and Data Programme 2020/21 and 2021/22

This paper will be considered in public

1 Summary

- 1.1 This submission presents the strategic case for the overall Technology and Data Investment Programme (the Programme). This authority covers financial years 2020/21 and 2021/22. The Programme will return annually to the Committee to renew and validate a rolling two-year approval. This ensures that approvals are aligned to financial years to complement the nature of this Programme.
- 1.2 We are only seeking authority for activities that are directly funded by the Technology and Data (T&D) team in this paper.
- 1.3 We have excluded activities T&D is closely involved in delivering but for which authorities are secured separately by other TfL directorates (e.g. Surface Transport or London Underground). We have also excluded the Home Office funded Emergency Services Network (ESN) programme and our Public Cellular Network (PCN) project which, due to the time constraints of these projects, were granted approval separately by the Committee in December 2019. The Telecommunications Commercialisation Programme will be considered separately by the Finance Committee on 11 March 2020 as it involves a concession structure.
- 1.4 The existing Financial Authority, Estimated Final Cost and Programme and Project Authority in the table below is net of over programming. It is proposed that unused Programme and Project Authority in financial year 2019/20 will be carried forward into financial year 2020/21.
- 1.5 A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by 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.

Table 1: Summary of the Programme and Project Authority request

Technology and Data (T&D) Investment Programme for 2020/21 and 2021/22				
Existing Financial Authority for 2020/21 and 2021/22	Estimated Final Cost for 2020/21 and 2021/22	Existing Programme and Project Authority for 2020/21 and 2021/22	Additional Authority Requested for 2020/21 and 2021/22	Total Programme and Project Authority for 2020/21 and 2021/22
£145.4m	£145.4m	£98.1m	£47.3m	£145.4m

2 Recommendation

2.1 The Committee is asked to note the paper and the supplemental paper on part 2 of the agenda:

- (a) approve a reduction in Programme and Project Authority of £20.1m for financial year 2020/21 and additional £67.4m for financial year 2021/22, resulting in net additional Programme and Project Authority of £47.3m, giving a total of £145.4m; and
- (b) note that Procurement Authority for the initiatives in the Technology and Data Investment Programme described in this paper will be sought at officer level in accordance with Standing Orders.

3 Background

- 3.1 T&D provides the core infrastructure, services and enabling technologies that allow TfL to deliver on the priorities set out in the Mayor's Transport Strategy and the needs of our customers and operating businesses.
- 3.2 Since coming together as an organisation in 2017 following the merger of several technology teams, we have continued to drive costs out through consolidation and simplification of our services and core infrastructure, while still improving the end user experience for our staff through an improved digital workplace. Overall our operating cost has dropped from £362m in 2015/16 to £248m in 2019/20, a reduction of 32 per cent. Our capital expenditure has also dropped similarly. Additionally, the work we do creates savings elsewhere. Although it is difficult to measure this fully just one example sets out the scale of the savings: on the Connect telecommunication system alone, the budget for which sits with LU, the operating cost has dropped by over £40m per year.
- 3.3 These savings have been achieved in an environment dominated by large and critical legacy assets that present challenges around the resiliency and efficiency of our technology. Much of our capital expenditure is focused on improving this and establishing a core technology stack that is more resilient, without necessarily enhancing their core functionality. For example, we were running with two different Enterprise Resource Planning (ERP) systems ever since the acquisition of Tube Lines Limited in 2010, which has now been resolved. Some 72 asset management systems are being systematically merged to create a unified asset management platform. Dozens of telecommunications networks, all in a poor state, have been consolidated into a modern network, although more remains to be done here. This sort of legacy problem is common to large businesses but there are few examples where these have been tackled thoroughly. Our results in this area are what brings better performance at lower cost.
- 3.4 While we have been dealing with legacy systems we have also been creating modern, world leading products, such as our Contactless fare collection system that have created a payments revolution worldwide. We have not allowed legacy systems to stop us from innovating where innovation can bring business value.

- 3.5 Many challenges remain in our technology stack, as will be evident from this submission. Many continue to relate to legacy technology. Others are about using technology to bring better services to our operating businesses or to customers.
- 3.6 Our assets and services extend across the organisation. On a day-to-day basis, we support over 2,000 software applications and systems, over 30,000 active users and 11,000 servers on our estate. These support our core office based IT, as well as a large suite of operational systems and customer facing systems. We collect and process vast amounts of data daily, including 22 million transactions journeys made using Oyster and contactless payment, circa 670 million rows of bus event data every day and 500,000 rows of train diagnostic data on the Central line alone.
- 3.7 In addition to T&D-funded initiatives, we support every other business area to deliver business funded projects that carry a technology or data component. For example, we continue to support LU to upgrade and replace obsolescent kit on the safety critical Connect network. We are working with both Surface and LU on their respective Asset Management Information Systems (AMIS) and are working closely with Surface Transport on their Surface Intelligent Transport System (SITS) programme and the Direct Vision Standards (DVS) project, just to name a few.
- 3.8 LU and Surface technology investment is approved and governed at LU's Technology and Networks Client Forum and Surface's Technology Programme Forum respectively. T&D works with the relevant teams to understand and deliver technology needs and to ensure T&D adheres to the governance set out by the business areas.
- 3.9 We have organised ourselves around 16 core programmes. As we have a common resource pool for all technology related investment some of these programmes do not contain any investment from the T&D Programme. These programmes are described in more detail in Appendix 1.
- 3.10 We have continued to develop our operating model to deliver a directorate with clear accountabilities and decision-making responsibilities. This is to ensure that we meet TfL's needs in the most efficient way and with the ambition of having complete transparency and clarity regarding where funding is going to be invested.

4 Programme delivery progress in 2019/20

Progress against commitments in the 2019 Technology & Data programme

- 4.1 In March 2019, T&D received Programme and Project Authority for 2019/20 and 2020/21 of £166.3m. For 2019/20 this was £93.9m and for 2020/21 this was £72.4m. Our 2019/20 authority included Data Centre Consolidation credits totalling £12.8m, bringing the net budget to £81.1m. Against the net budget of £81.1m we are currently forecasting outturn spend of £68.2m, an underspend of £12.9m.
- 4.2 During this financial year, T&D has delivered significantly challenging and diverse projects, funded not only by T&D, but by wider TfL business areas and by central government, which have delivered financial benefits for the organisation. Some examples of these can be seen in Appendix 2. In some cases these projects have been unplanned or unforeseen whereas in others their scope has increased, naturally diverting resources from our Programme.

- 4.3 The underspend requires corrective action, both to improve delivery and to improve budgeting for future years. We have conducted an analysis of the main causes for the forecast underspend. Any such analysis is complicated by the fact that the same teams and resources are working on the T&D Programme, other programmes funded by LU and Surface and the very substantial activities on telecommunications that are part funded by the Home Office.
- 4.4 The analysis shows that the causes of underspend are complicated. On one hand there are good reasons for underspend as savings were achieved or higher priority deliverables required by LU or Surface were put ahead of our Programme. Resourcing constraints have slowed or stopped progress on some projects. In some cases projects have been delayed due to risks being encountered but the overall spend on the project will be incurred in the future. In other cases project managers have been optimistic about what they can achieve. Against these causes of slippage, we have been able to accelerate some projects and there have been overspends on a small number of projects as well.
- 4.5 The causes for this kind of variance cannot be addressed at a project level as the variables that affect them are those that impact the entire T&D team. Instead we have decided to include a management level overlay for over programming for the current year. Since this overlay was included we have been tracking our budget very closely.
- 4.6 We propose to address this for future years at a Programme level in a similar manner, as set out below.

Our Budgeting Solution

- 4.7 During the most recent Business Planning round, we identified additional spend over the life of the plan of £62.8m. A line by line review on all projects was completed and agreed, with all spend being deemed essential.
- 4.8 However, to address the issue of forecasting optimism a management decision was taken to include an additional over programming overlay to bring the total spend during the Business Plan back to last year's Business Plan. This means that the entire £62.8m is taken as an over programming allowance.
- 4.9 Overprogramming allowances mean that it is possible that spend in any one year may exceed authority levels if delivery accelerates compared to current trends. Were that to happen we will need to seek supplemental authority.

Remedial Actions

- 4.10 We have several initiatives underway to address the issues we have identified in the analysis of variance in expenditure. These include:
- (a) financial acumen workstream – a programme of work looking at the financial knowledge and understanding of staff T&D wide;
 - (b) improved processes and management controls for project estimation;
 - (c) improved project and financial reporting from both technology programmes and finance teams;

- (d) better risk management and controls; and
- (e) frequent and robust tracking of Tech & Data key milestones, which are tracked and controlled internally.

4.11 These measures are being supported by:

- (a) more rigorous management of T&D's finances by the Chief Technology Officer and T&D's senior management team with very detailed, project by project quarterly reviews;
- (b) more rigorous controls and checks from the project controls team who will be providing deeper first line assurance on all projects; and
- (c) a new project management tool that will centralise reporting and generate automatic alerts to reduce the level of manual interventions currently required.

5 Progress on recommendations from the 2018 Independent Assurance Review

- 5.1 Seven actions were agreed last year within the T&D 2018/19 Programme and Project Authority approval and have all been completed and closed except for one.
- 5.2 The remaining open recommendation is regarding resourcing constraints due to rates of pay impeding the ability to recruit for specialist roles. This is still being addressed, in part by a comprehensive benchmarking of key roles and providing a possible adjustment to pay bands to address these attraction and retention challenges. The review is also looking to seek changes in the approval process for roles that require high pay.
- 5.3 Progress has been reported on a quarterly basis to the Committee.

6 Proposal: Programme delivery in 2020/21 and 2021/22

- 6.1 This section sets out the Programme and Project Authority sought for financial years 2020/21 and 2021/22 and what the investment in each portfolio will deliver.
- 6.2 Broadly speaking, the funding requested in this paper falls within two categories:

(a) Renewal – the refresh of assets and infrastructure:

- (i) the business driver is to replace a service (e.g., hardware or software) and/or keep it in support. While this often applies to end-of-life services, it also applies to services that are upgraded early for strategic reasons; and
- (ii) the service is replaced by either the same technology or a different technology which delivers the same capability, or the same plus enhancements/additional capabilities.

(b) Enhancement - innovation and transformation:

- (i) the business driver is the need for an entirely new capability or asset; and
- (ii) the driver may also be a requirement to be more efficient in how we use our assets, estate or people and/or to clean up previous decisions that have resulted in inefficient outcomes. For example, if an initiative replaces an existing capability with technology that will significantly change the way the asset operates and performs, we will likely require significant people, business culture or process change to accommodate.

6.3 Approximately two-thirds of the T&D Programme is spent on renewals. The rest is spent on enhancements. Figure 1 below shows this broken down by portfolio.

6.4 Owing to the speed of technology advancement and subsequent rate of technological redundancy, T&D may be required to make additional investments to meet the changing needs of our business. It is proposed that any additional Programme and Project Authority that is required will be sought in accordance with TfL's Standing Orders and on the basis that unbudgeted Financial Authority can also be obtained.

Figure 1: The Technology & Data portfolios' total investment Business Plan

A: Renewals - 61%

B: Enhancements - 39%

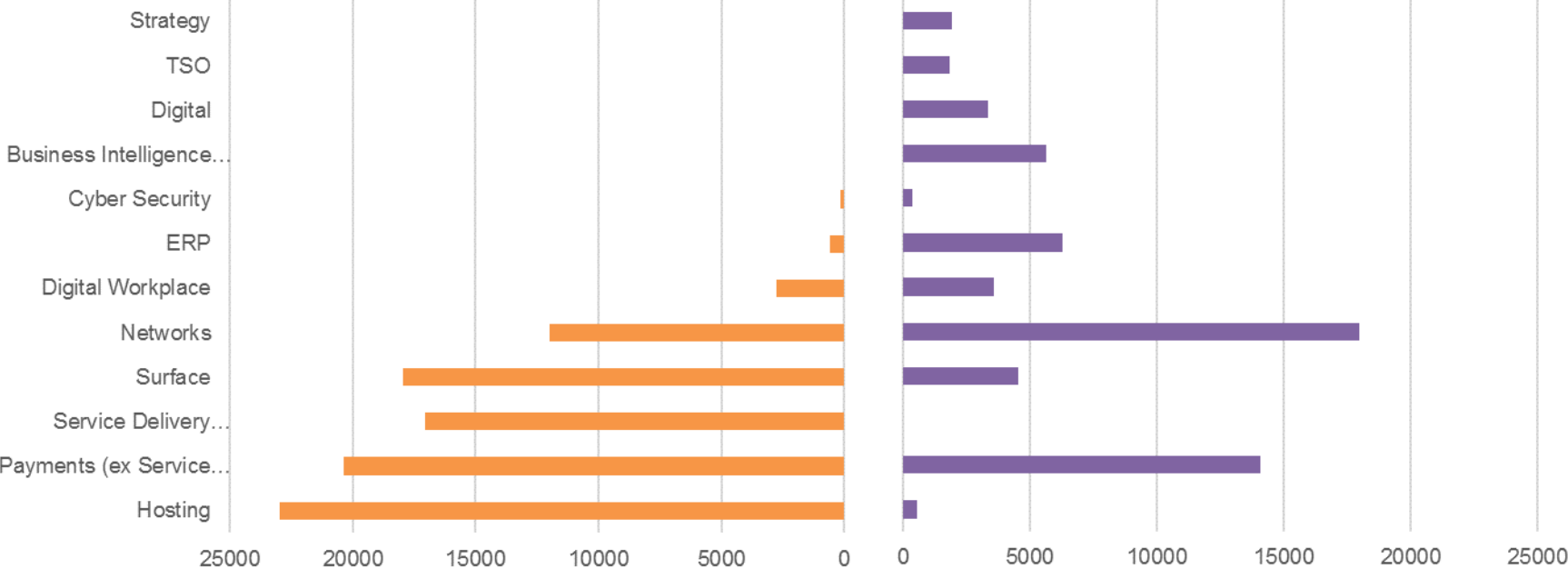


Figure 2: Summary of Programme Authority by Portfolio.

Portfolio / Product Family	Estimated Final Cost (£k)		Valid Existing Authority (£k)		Additional Proposed Authority (£k)	
	2020/21	2021/22	2020/21 (incl 19/20)	2021/22	2020/21	2021/22
	Note 1		Note 2		Note 3	
Payments - CUBIC Service Delivery Assurance	8,283	8,751	5,725	-	2,558	8,751
Payments	12,940	25,818	16,818	-	(3,878)	25,818
Enterprise Resource Programme (ERP)	9,748	4,545	9,496	-	252	4,545
T&D Surface	9,492	15,975	11,962	-	(2,471)	15,975
Networks	20,258	9,381	7,783	-	12,474	9,381
Hosting	16,729	11,830	23,528	-	(6,799)	11,830
End User Computing (EUC)	6,895	1,669	5,438	-	1,456	1,669
Contact Centre Operations (CCO)	1,693	279	2,200	-	(507)	279
Cyber Security (CSIRT)	3,129	150	2,731	-	398	150
Infrastructure & Operations - Technical Service Operation (TSO)	1,631	713	6,235	-	(4,603)	713
Business Intelligence (Data & Analytics)	1,592	1,065	620	-	972	1,065
Content & Collaboration	1,946	296	1,125	-	821	296
3 Hub	-	-	2,340	-	(2,340)	-
Other Projects (incl Asset Mngmt, Digital, Strategy, Small Works)	7,829	3,261	(3,018)	-	10,847	3,261
Management adjustment	(24,210)	(16,317)	5,108	-	(29,319)	(16,317)
Total Authority Required	77,954	67,417	98,092	-	(20,138)	67,417

Note 1 - Estimated Final Cost for FY20/21 & FY21/22 are based on the draft Budget submission 1

Note 2 - Includes

- £72.4m authority for FY20/21 approved at Programmes & Investment Committee in March 2019

- £25.7m of unused authority from FY19/20 carried over into FY20/21

Note 3 - Additional Proposed Authority requested for FY20/21 & 21/22

Figure 3. Summary of the T&D Programme and Project Costs and Funding

Portfolio		Business Plan Year					Total	
		20/21	21/22	22/23	23/24	24/25		
Rounded to £m								
Cost	Base Gross Draft Budget values		102.2	83.7	95.6	71.0	68.2	420.7
	Management adjustment to account for schedule optimism		(24.2)	(16.3)	(25.6)	(2.1)	(1.8)	(70.0)
	Investment Programme Total	(A)	78.0	67.4	70.0	69.0	66.4	350.7
Funding	Financial Authority from Draft Budget values	(B)	78.0	67.4	70.0	69.0	66.4	350.7
Authority	Existing Project Authority	(C)	98.1	-	-	-	-	98.1
	This Project Authority request	= A - C	(20.1)	67.4				47.3
	Future Project Authority request	= A - C			70.0	69.0	66.4	205.3

(A) is net of the management adjustment for overprogramming

(B) is based on the latest draft Budget, sign off due in late March 2020

(C) FY20/21 existing authority includes carryover of unused authority from FY19/20

7 Assurance

- 7.1 TfL Project Assurance conducted a Programme Assurance Review (PAR) on the T&D Programme in January 2020.
- 7.2 The objective of the PAR was to assess the Programme's readiness to deliver its outcomes. The PAR followed lines of inquiry to answer the challenge of "Is the Programme sufficiently well managed for the Programme and Investment Committee to award authority?"
- 7.3 The lines of enquiry were:
- (a) Project Management & Governance;
 - (b) Programme and Portfolio Management & Governance;
 - (c) Risk;
 - (d) Performance over the past year;
 - (e) Portfolio level financial management;
 - (f) Assurance;
 - (g) T&D Forum and Chair's Action; and
 - (h) Political.
- 7.4 Full and open discussions were held throughout the PAR, both within the panel itself and with members of the programme team.
- 7.5 The Independent Investment Advisory Group (IIPAG) agreed that the review was carried out in a professional, thorough and competent manner.
- 7.6 No critical issues were identified through the Independent Assurance Review. All recommendations have been accepted.

List of appendices to this paper:

Appendix 1: Technology and Data Programme summaries
Appendix 2: Significant project deliveries from Technology and Data 2019/20
A paper containing exempt supplemental information is included on Part 2 of the agenda.

List of background papers:

Independent Investment Advisory Group (IIPAG) Report
Project Assurance Report
Management response to IIPAG and Project Assurance Reports

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Appendix 1: Technology & Data Programme Summaries

<p>Programme 1 – Technology Services Operations (TSO)</p>	<p>TSO deliver projects to ensure the day to day provision of suitable IT services, including operationally-critical applications and investment to refresh our data centre servers. Embed proactive performance management to maximise service continuity and availability, and reduce costs through tighter financial controls, contract optimisation and removing service duplication.</p>
<p>Programme 2 - Surface</p>	<p>The Surface programme delivers changes to the technology applications, systems, platforms and services that are utilised to manage the road and bus network such as the Surface Intelligent Transport System, I- Bus, Dial-A Ride and the Surface Asset Management Information System.</p>
<p>Programme 3 – Networks</p>	<p>Networks is looking to reduce the total cost of ownership of data network and telecommunication services; the provision of fit-for-purpose services which deliver what projects and programmes specify they need, where and when they need it; the establishment of best-in-class service management capabilities to oversee the ongoing delivery of the services; the implementation of robust and effective governance and control process to ensure optimal benefits realisation.</p> <p>We will invest to establish a unified, interconnected data network shared by our entire organisation, by minimising the duplication of network footprints and cost-effectively consolidating services to reduce costs. Projects include the refresh of the core network infrastructure provided via the Access and Wide Area Network Contract with Capita, and the Emergency Services Network, Connect, Public Cellular Network pilot, Telecoms Commercialisation Project and Wi-Fi upgrade project.</p>
<p>Programme 4 – Enterprise Resource Planning (ERP)</p>	<p>ERP incorporates the processes we use to conduct our 'back office' activities. We will invest to retain and re-platform the existing system (mostly SAP) to support the ongoing improvement of our Human Resources (HR), Finance and Supply Chain business processes by delivering a more efficient supply chain capability to Commercial; standardising how Finance plan, budget, forecast and report financial information across the business; and providing greater access to user friendly HR technology for our people. We will exploit Cloud technology to enable this.</p>

<p>Programme 5 – London Underground (LU) and Rail</p>	<p>Delivery of technology projects as aligned to the LU business plan and product roadmaps. This includes delivery of technology workstreams in large LU programmes as well and full delivery lifecycle of technology focussed projects on behalf of LU.</p>
<p>Programme 6 - Major Rail Extensions and Telephony</p>	<p>Installation and/or changes of Fares and Ticketing devices and associated equipment across TfL and Train Operator Company (TOC) sites. This is in support of new builds, modifications and extensions to Oyster and Contactless ticketing. In addition, this covers delivery of voice and data type projects across TfL.</p>
<p>Programme 7 – Digital Workplace (EUC, Content and Collaboration, 3 Hub Accommodation)</p>	<p>This programme delivers to TfL staff Digital Workplace products and services that are a good fit for their roles, easy to use, affordable for TfL, and help them to perform their work most effectively. The products and services conform to T&D’s overall strategy and T&D architectural principles such as standardisation, scalability and value for money. TfL workers will be upskilled in adopting digital technologies, enabling them to be mobile and more productive, leading to an increase in the use of virtual meetings and therefore more efficient building utilisation.</p>
<p>Programme 8 - Payments and Ticketing</p>	<p>Deliver a secure and compliant ticketing system, a better customer proposition and reduced revenue collection costs. Maintain and upgrade revenue collection assets to assure their service performance.</p>
<p>Programme 9 - Road User Charging</p>	<p>The Road User Charging programme supports the many initiatives in the Mayor’s Transport Strategy aimed at ensuring London roads and environments are safe for travel, these initiatives range from schemes to improve air quality, improve safety standards on heavy goods vehicles and encourage cleaner modes of transport. T&D is responsible either directly or indirectly (through third party suppliers) for supporting the delivery and maintenance of all the technology that sits behind these initiatives. Our products include maintaining the relevant TfL websites, building back office systems and seeking new and more efficient ways to improve services to our customers while delivering on the Mayor’s Transport Strategy.</p>
<p>Programme 10 - Hosting</p>	<p>Hosting is how we organise, process, store and disseminate large amounts of data. We aim to provide a flexible, scalable and agile hosting model that allows us to adapt to changing business needs. Savings are realised from reduced data centre lease costs and lower infrastructure refresh costs.</p>

Programme 11 - Data and Analytics	Collect, manage and deploy data to drive evidence-based decision making. We will continue to exploit transport data that drives operational performance, supports future planning, and provides our customers with data services and information while complying with data regulations.
Programme 12 – Contact Centre Operations (CCO)	<p>CCO operate several established customer service businesses through various channels including telephony, email, social media and face-to-face.</p> <p>We invest in projects with the aim of reducing the ongoing cost of operation while maintaining the current service level.</p>
Programme 13 - Digital	The Digital programme ensures that TfL maintains a direct digital relationship with its customers so that it can deliver on the Mayor’s Transport Strategy. Without that relationship we cannot nudge customers towards sustainable transport modes.
Programme 14 - Cyber	To ensure TfL’s resilience against cyber attack, by delivering capabilities that; protect, detect, recover and respond to cyber events, together with providing governance, guidance and policies to manage cyber risk.
Programme 15 - Accommodation	This programme ensures that all employee and third party movement around the TfL estate has IT provisioned (client hardware, telephony and network) for our staff to work in the various TfL office buildings. This includes decommissioning of buildings, departmental moves and new buildings.
Programme 16 - Mobile	This programme develops mobile solutions for TfL’s internal teams that help to improve current ways of working. For example, developing a paperless mobile solution for fault reporting of assets across LU – users are able to log faults anywhere using their mobile devices (rather than making notes of fault then coming back to office and record on a personal computer).

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Appendix 2: Significant project deliveries from Technology & Data 2019/20

During this financial year, Technology & Data (T&D) has delivered significantly challenging and diverse projects, funded not only by T&D, but by wider TfL business areas and by central government, which have delivered both financial and political benefits for the organisation.

- We reduced the footprint in our primary data centre by two thirds, reducing not only our environmental impact, but also saving TfL £25.7m over the next five years.
- We have migrated the legacy Tube Lines enterprise resource planning (ERP) system (Oracle e-Business) to SAP and integrated with the Metro Maximo system, used for asset maintenance on the Jubilee, Northern and Piccadilly lines. In addition to being an important enabler for the asset management information strategy to deliver one asset management system, it also delivers £9.4m net present value savings over the next 10 years.
- 70km of tunnel cabling and equipment in eight LU stations has been installed to support the non-commercial pilot of 4G service on the Jubilee line (a commitment in the Mayor's Transport Strategy which was not part of last year's Business Plan).
- We have delivered and tested over 335km of leaky feeder and over 295km of fibre in LU tunnels for the Home Office's Emergency Services Network (ESN) project.
- We have improved remote working by migrating 8,400 users from RSA tokens to the new Multi Factor Authentication (MFA) service, saving £500k over five years. Over 7,000 users have been migrated to Windows 10 so far, over 8,000 thick and thin clients have been replaced with new, faster devices, and over 3,000 new laptops have been deployed.
- We have successfully piloted the Irregular Travel Analysis Platform (ITAP) tool which is successfully supporting the pan TfL revenue protection programme, and funding has been agreed to roll this tool into production. We have also piloted new body worn cameras and docking stations in Stratford station to help tackle work related violence and aggression towards our staff, the cameras will be rolled out across the network during 2020/21.
- There have also have been various upgrades to legacy systems such as Tracker Net, where we have improved the accuracy and reliability of the real-time train movement data that's available to staff and customers. This has included work to ensure the system consumes and visualises the enhanced train position data that is available after signalling upgrade work (Four Lines Modernisation Programme and the Piccadilly line Interim Upgrade Project), work to improve data feed resiliency (Central line and Connect Radio Upgrades), and several new features for users (including a view for train managers).

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Programmes and Investment Committee



Date: 5 March 2020

Item: Members' Suggestions for Future Discussion Items

This paper will be considered in public

1 Summary

- 1.1 This paper presents the current forward programme for the Committee and explains how this is put together. Members are invited to suggest additional future discussion items for the forward programme. Members are also invited to suggest items for future informal briefings.

2 Recommendation

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

3 Forward Programme Development

- 3.1 The Board and its Committees and Panels have forward programmes. The content of the programme arise 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 these are the quarterly Investment Programme Report and the regular report on the Crossrail project.
 - (b) Programmes and Projects at a level requiring Committee approval. These include the annual review of the 20 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 Chairs of all of the Committees and Panels will regularly review the forward programme 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 Programme

- 4.1 The current programme 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 Planner 2019/20

List of Background Papers:

None

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Programmes and Investment Committee Forward Planner 2019/20

Membership: Prof Greg Clark CBE (Chair), Dr Nelson Ogunshakin OBE (Vice Chair), Heidi Alexander, Ron Kalifa OBE, Dr Alice Maynard CBE, Mark Phillips, Dr Nina Skorupska CBE, Dr Lynn Sloman and Ben Story

Abbreviations: Managing Director (MD), Customer, Communication and Technology (CCT), London Underground (LU), Surface Transport (ST), CFO (Chief Finance Officer) and D (Director)

May 2020		
Use of Delegated Authority	General Counsel	Standing item
Elizabeth Line Readiness and Crossrail Update	MD LU and TfL Engineering, and D Elizabeth line Ops	Regular update on progress
Quarterly Programmes and Investment Report	MD LU, MD ST and D Major Projects	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
TfL Project Assurance	Project Assurance	Standing item
IIPAG Quarterly Report (appendix on Second line Assurance Activities)	Project Assurance	Standing Item
LU Major Stations	MD LU	Update
Northern Line Extension	MD Major Projects	Update
DLR Rolling Stock Replacement	MD ST	Approval
London Overground East London Line	MD ST	Approval

Programmes and Investment Committee Forward Planner 2019/20

July 2020		
Use of Delegated Authority	General Counsel	Standing item
Elizabeth Line Readiness and Crossrail Update	MD LU and TfL Engineering, and D Elizabeth line Ops	Regular update on progress
Quarterly Programmes and Investment Report	MD LU and TfL Engineering, MD ST and D Major Projects	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
TfL Project Assurance	Project Assurance	Standing item
IIPAG Quarterly Report (appendix on Second line Assurance Activities)	Project Assurance	Standing Item
Surface Technology	MD ST	Update

September 2020		
Use of Delegated Authority	General Counsel	Standing item
Elizabeth Line Readiness and Crossrail Update	MD LU and TfL Engineering, and D Elizabeth line Ops	Regular update on progress
Quarterly Programmes and Investment Report	MD LU and TfL Engineering, MD ST and D Major Projects	To note high-level progress update against the 20 grouped Investment Programme and Major Project items and any specific approvals required in relation to programmes not on the deep-dive list for that meeting.
TfL Project Assurance	Project Assurance	Standing item

Programmes and Investment Committee Forward Planner 2019/20

IIPAG Quarterly Report (appendix on Second line Assurance Activities)	Project Assurance	Standing Item
Air Quality Programme: Plans beyond 2021	D City Planning	Member request

Regular items:

- Use of delegated authority by Chair, Commissioner and CFO.
- Quarterly Monitoring Report – to include:
 - high-level progress update against the 20 grouped Investment Programme and Major Project items;
 - specific approvals required in relation to programmes not on the deep-dive list for that meeting;
 - identification of programmes about to issue tenders so Members can input;
- Second Line Assurance Activities
- IIPAG Quarterly Report
- 4/5 deep dive papers each meeting from the rolling programme of Investment Programme / Major Project items. Papers to seek annual approval for the programme.
- Crossrail 2 – updates and authorities (if kept separate from the Major Project list).
- Crossrail updates
- Innovation update (November 2020)

Items to be scheduled:

- London Overground future planning
- Bakerloo line extension (City Planning and LU)
- Rotherhithe to Canary Wharf Crossing

Future items for Committee or Board:

- How TfL investment programme is effected by:
 - HS2
 - Heathrow expansion
 - Oxford Street pedestrianisation
 - Football stadiums/events
 - TfL potentially taking over SE/SW rail.

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