

Agenda

Meeting: Programmes and Investment Committee

Date: Wednesday 18 December 2019

Time: 11.00am

**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://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
Tuesday 10 December 2019

**Agenda
Programmes and Investment Committee
Wednesday 18 December 2019**

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 23 October 2019
(Pages 1 - 12)**

General Counsel

The Committee is asked to approve the minutes of the meeting of the Committee held on 23 October 2019 and authorise the Chair to sign them.

4 Matters Arising and Actions List (Pages 13 - 18)

General Counsel

The Committee is asked to note the updated actions list.

5 Crossrail Update (Pages 19 - 24)

Director, Elizabeth line Operations

The Committee is asked to note the paper and the supplementary paper on Part 2 of the agenda and to approve the changes proposed by Crossrail Limited to the current Final Incentive Scheme.

6 Strategic Risk Update - Opening of the Elizabeth Line (SR16) (Pages 25 - 36)

Director, Elizabeth Line Operations

The Committee is asked to note the paper

7 Investment Programme Report - Quarter 2, 2019/20 (Pages 37 - 138)

Director Major Projects and Managing Directors London Underground and Surface Transport

The Committee is asked to note the report.

8 Independent Investment Programme Advisory Group Quarterly Report (Pages 139 - 144)

Director of Risk and Assurance

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

9 TfL Project Assurance Update (Pages 145 - 148)

General Counsel

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

10 Use of Delegated Authority (Pages 149 - 154)

General Counsel

The Committee is asked to note the paper.

11 Air Quality Programme (Pages 155 - 192)

Managing Director Surface Transport

The Committee is asked to note the paper and approve additional Programme and Project Authority.

12 Emergency Services Network, 4G Pilot and Telecommunications Commercialisation Projects (Pages 193 - 196)

Director of Strategy & Chief Technology Officer

The Committee is asked to note the paper and Programme and Project Authority.

13 Barking Riverside Extension Update (Pages 197 - 204)

Managing Director Surface Transport

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

14 London Underground Power, Cooling and Energy (Pages 205 - 212)

Managing Director London Underground

The Committee is asked to note the paper and approve additional Programme and Project Authority.

15 London Underground Four Lines Modernisation Programme (Pages 213 - 220)

Managing Director London Underground

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

16 Member suggestions for future agenda discussions (Pages 221 - 224)

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.

17 Any Other Business the Chair Considers Urgent

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

18 Date of Next Meeting

Thursday 5 March 2019 at 10.15am

19 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.

20 Crossrail Update (Pages 225 - 386)

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

21 Independent Investment Programme Advisory Group Quarterly Report (Pages 387 - 392)

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

22 TfL Project Assurance Update (Pages 393 - 396)

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

23 Emergency Services Network (Pages 397 - 406)

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

24 Barking Riverside Extension Update (Pages 407 - 412)

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

25 London Underground Four Lines Modernisation (Pages 413 - 444)

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

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Transport for London

Minutes of the Programmes and Investment Committee

**Committee Rooms 1 & 2, Palestra,
197 Blackfriars Road, London, SE1 8NJ
10.15am, Wednesday 23 October 2019**

Members Present

Professor Greg Clark CBE (Chair)
Dr Nelson Ogunshakin OBE (Vice-Chair)
Heidi Alexander
Dr Alice Maynard CBE
Mark Phillips
Dr Nina Skorupska CBE
Dr Lynn Sloman

In Attendance

Executive Committee

Stuart Harvey Director of Major Projects

Other Staff

Alexandra Batey Head of Air Quality, Environment and Technology,
Investment Delivery and Planning (for minute 67/10/19)
Andrea Clarke Director of Legal
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 64/10/19)
David Hughes Investment Delivery Planning Director
Lorraine Humphrey Head of TfL Project Assurance
Rob Niven Head of London Underground Major Projects Sponsorship
(for minutes 60/10/19 and 68/10/19)
Emily Schofield Lead Sponsor - Stations & Civils Renewals, Investment
Delivery Planning (for minute 64/10/19)
Lucinda Turner Director of Spatial Planning (for minute 68/10/19)
Jamie Mordue Senior Committee Officer

Crossrail Limited

Mark Wild Chief Executive, Crossrail Limited (for minute 59/10/19)

Independent Investment Programme Advisory Group (IIPAG) Attendance

Alison Munro Chair, IIPAG

55/10/19 Apologies for Absence and Chair's Announcements

Apologies for absence were received from Ron Kalifa OBE and Ben Story. Mike Brown MVO, Howard Carter, Simon Kilonback, Vernon Everitt and Gareth Powell were also unable to attend the meeting.

The Chair informed the Committee that he would change the order of the agenda to consider the Crossrail Update (Agenda Item 5) immediately following the TfL Growth Fund report (Agenda Item 14).

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 Director of Legal or an appropriate member of the Executive Committee after the meeting.

Members noted that David Hughes would shortly be leaving TfL to take up a new role with Rail for the North. The Chair and the Committee thanked David Hughes for his contribution to TfL and wished him well in his new role.

56/10/19 Declarations of Interests

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

57/10/19 Minutes of the Meeting of the Committee held on 17 July 2019

The minutes of the meeting held on 17 July 2019 were approved as a correct record and signed by the Chair.

58/10/19 Matters Arising and Actions List

Andrea Clarke introduced the paper which set out progress against actions agreed at previous meetings of the Committee.

The Committee noted the actions list.

59/10/19 Crossrail Update

David Hughes introduced the paper, which provided an update on the status of the Crossrail project.

Crossrail Limited (CRL) continued to fully develop cost forecasts and risk mitigation actions, including quantifying the potential savings that could arise from their implementation. Positive performance had been reported against the schedule baseline.

Mark Wild told the Committee that safety remained key for CRL and that it was working in lock-step with TfL to ensure employees were working safely to deliver a safe railway. The lessons learned from an incident at Farringdon station, involving the collapse of scaffolding, had been shared throughout CRL. A safety stand down had been held, where 7,000 workers stopped work to discuss safety matters.

The progress of the physical work of the project was broadly in line with the P50 risk assessment. The Global System for Mobile Communications-Railway had been installed throughout the tunnels, Tottenham Court Road station was nearing completion and Farringdon station platforms were now personal protective equipment free.

The project was on the critical path in terms of software and a huge effort had been made with Siemens and Bombardier on the latest version of software. PD+10 (Version 10) had been introduced in the central tunnels but was assessed and found to be slightly under threshold that would allow safe operation of trial running. PD+11 was expected to be delivered in early December 2019 and would allow trial running in early 2020.

TfL and MTR Crossrail were on course to start operating the stopping services from Paddington mainline station to Reading in December 2019, under the TfL Rail brand. Services to Heathrow were expected to start in the first part of 2020.

Mark Wild told the Committee that there were 30 elements that would be handed over to the operator. Each element required an individual Handover Execution Plan, as set out in the Handover Strategy Plan. To date, two elements had been handed over. Members asked about the 31 fire panels that would need to be replaced, owing to obsolescence. The Committee was told that more issues could be found but these were likely to be multiple small issues than big issues.

The Project Representative (P-Rep) was in place to provide the Sponsors with oversight of project delivery, advising and raising points of challenge, and scrutinising progress. Mark Wild welcomed the assurance from the P-Rep and other assurance work but stressed that critical areas of the project needed to be allowed to continue with their focus on delivery.

Operating stages four (through services from Paddington to Shenfield) and five (through services from Reading and Heathrow to Abbey Wood and Shenfield) were the most valuable in terms of unlocking all the benefits of delivering the project. This would require a metronomic running of trains in the central core. The pressure felt in delivering stage three would be worth the reward when stages four and five were operational. The schedule for moving from stage three to four and five would be presented to the CRL Board in November 2019.

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

60/10/19 Investment Programme Report – Quarter 1 2019/20

Stuart Harvey introduced the paper, which set out the progress and performance in Quarter 1 2019/20 of a range of major projects and sub-programmes delivering transport services to London. Stuart Harvey told the Committee that there had been 10m working hours without an injury.

The Piccadilly Line Upgrade programme was on track to complete the associated milestone for the train concept design ahead of the January 2020 target. The

Northern line extension to the new terminus at Battersea Power Station, via a new station at Nine Elms, was tracking well against its milestones and forecast completion date of September 2021. The roof at the new station entrance of the Bank station upgrade project had been installed in late summer 2019 and waterproofing works had been completed.

The award of the contract to design, build, operate and maintain the Silvertown Tunnel was forecast for mid November 2019.

David Hughes updated the Committee on matters relating to surface transport and London Underground. The new South Bank entrance at Waterloo station was completed in May 2019, with three new escalators and associated back of house systems and accommodation facilities in operation.

The London Borough of Southwark had recommended that planning permission be granted for a new town centre at Elephant and Castle, subject to Greater London Authority and Secretary of State approval. As part of the development, a new station box with tunnels to existing platforms would provide step-free access to the Northern line and increase capacity. As the entrances to the Northern and Bakerloo lines were separate at Elephant and Castle, it was planned that step-free access to the Bakerloo line be included in the proposed Bakerloo line extension.

The Accessibility Programme was challenging, compared to what TfL had delivered previously. Good progress was being made and it would deliver step-free access to a further 15 London Underground stations and make over a third of stations accessible. TfL continued to work with stakeholders, including the London Legacy Development Corporation, to consider access and capacity improvements at Stratford station.

It was now the default position that step-free access be included in stations works, unless there was a compelling reason why it could not be delivered. Members requested a briefing on the work done to improve accessibility and the inclusion strategy, including but not limited to step-free access.

[Action: Staynton Brown]

The Committee heard that recent disruption to the Jubilee line service was a result of cracks being found in a coupling plate between carriages, during routine inspection. Detailed checks, including visual and ultrasonic tests, were carried out on the entire fleet, which had shown the cracks were uniform in pattern. A conservative approach to safety had been taken to ensure that all trains were safe to operate. Further checks had found that no other lines were affected; although the Northern line fleet was similar, the length of the trains was different, which was potentially a factor. TfL was working with the fleet manufacturers and an exact time scale would not be possible until the cause had been determined. TfL apologised for the inconvenience caused to customers. Members would be updated when more detail was available.

[Action: David Hughes]

At Highbury Corner the footway paving, kerbing and traffic switchover to two-way operation was completed in June 2019; the main highway and urban realm work was complete, with the removal of the gyratory and reconfigured road network. Old Street Roundabout works to remove traffic islands and the traffic switchover to two-way operation was completed over the late May 2019 bank holiday weekend. Further

traffic works would be needed in the future to facilitate the construction of the public space and new main station entrance. The main station entrance was on track to be completed at the end of 2020.

In May 2019, the length of protected cycle infrastructure surpassed the 2016 baseline of 53km, with 112km complete or under construction. To what extent that distance of cycle infrastructure that was completely separated from traffic would be confirmed to Members following the meeting. **[Action: David Hughes]**

Options were being examined for a new ferry service between Rotherhithe and Canary Wharf, to improve connectivity for pedestrians and cyclists. Members would receive a briefing following the meeting and a paper would be submitted to a future meeting.

On Safer Junctions, TfL was on track to deliver 41 schemes by spring 2020, with 29 schemes already completed. Phase one concept design and consultation of the Vision Zero Action Plan was completed in July 2019. The proposals included installing 20mph signs and road marking on all TfL Road Network routes and installing raised pedestrian crossings at seven locations, where clusters of collisions that resulted in somebody being killed or seriously injured had occurred.

The Ultra Low Emission Zone was successfully launched in April 2019 and compliance remained higher than previously forecast. A paper on the Air Quality and Environment Programme appeared later on the agenda.

TfL had been working with the London Borough of Hammersmith and Fulham to progress an appropriate solution to mitigate the impact of the closure of the Hammersmith Bridge. Although the bridge was not a TfL asset and funding would have to come primarily from the borough, TfL had committed £25m for design costs and was engaging in ongoing discussions. TfL carried out regular inspections on its assets and had a good understanding of its asset base.

Members requested that greater detail on energy be included in future reports. A briefing on energy efficiency and energy strategy was requested.

[Action: Alex Williams]

The Committee noted the report.

61/10/19 Independent Investment Programme Advisory Group Quarterly Report

Items 7 and 8 were taken together at the meeting but have been minuted separately.

Lorraine Humphrey introduced the paper, which set out the Independent Investment Programme Advisory Group's (IIPAG's) quarterly report.

Alison Munro told the Committee that there were consistent themes emerging from the IIPAG's reviews, for example: capability and resources; programme and portfolio management; and cost and risk estimates and tracking.

There was good work on the signalling strategy and encouraging progress on engineering resource. The action plan on engineering resource was being reviewed regularly and staff were adjusting to the change in resource model.

Resources were being managed to ensure that employees were given opportunities to develop experience, for example the Major Projects Directorate had a talent management track to help staff to develop and gain broader experience.

IIPAG had recommended that TfL establish a rigorous and consistent approach to the quantification and valuation of economic development and housing benefits investment. Members stated that, if TfL could develop policies better than current Treasury guidance, it should not be constrained by current government approaches.

Alison Munro told the Committee that she felt IIPAG had appropriate resources at present and was aware that it could pull in extra resource if required.

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

62/10/19 TfL Project Assurance Update – Quarter 2 2019/20

Lorraine Humphrey introduced the paper, which provided an update on the project assurance work undertaken in Quarter 2 2019/20.

A total of 31 reviews were undertaken during the quarter, consisting of one programme and 30 project assurance reviews. Sixty-seven recommendations were made, of which seven were considered to be critical issues, as set out in Appendix 1 of the Committee paper.

The total number of overdue recommendations had reduced and key performance indicators had been introduced to ensure that overdue recommendations were closed out within three months. The Project Assurance team was working with teams to determine achievable but stretching targets and to determine recurring themes and areas where it could add the most value.

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

63/10/19 Use of Delegated Authority

Andrea Clarke introduced the paper, which provided an update on the use of Chair's Action and of Programme and Project Authority in respect of matters within the Committee's remit, since the last meeting of the Committee.

There had been no uses of Chair's Action and two uses of Procurement Authority by the Chief Finance Office, in relation to the Essential Maintenance Programme and the supply of parts.

The Committee noted the paper.

64/10/19 London Underground Stations Renewals and Enhancements Programme

David Hughes introduced the paper, which set out the third annual Programme and Project Authority request of a further £176.84m and updated the Committee on progress since the last submission.

The purpose of the Programme was to deliver renewed and enhanced assets to improve safety, reliability, accessibility and customer satisfaction, whilst reducing maintenance costs.

The Programme comprised of three elements: Accessibility, including step-free access to make the network available to more Londoners; Stations Enhancements, to respond to growth in demand for travel and to support local area regenerations, housing and job creation; and Renewals, to ensure that the stations and assets were safe and operable. Programme and Project Authority was sought for stations enhancements and renewals as the Accessibility element was fully funded through to 2024.

The Committee noted the paper and approved additional Programme and Project Authority of £176.84m giving a total Programme and Project Authority of £753.63m for the London Underground Stations Programme.

65/10/19 London Underground Lifts and Escalators Renewals Programme

The Committee expressed their condolences and sympathies to the family of Christian Tuvi, who had tragically died whilst working on a moving walkway at Waterloo station. Vernon Everitt, Interim Managing Director, London Underground, had attended and spoke at the funeral.

David Hughes introduced the paper, which set out the Programme and Project Authority request for the London Underground Lifts and Escalators Renewals Programme for 2020/21 to 2022/23 and updated the Committee on progress since the last submission.

The Authority requested would be used for the new in-truss approach to escalator renewal. The in-truss approach was being trialled at Wood Green station, due to complete in March 2020, and reduced the need for civil construction works, which would deliver a saving of around £175,000 per machine.

After the trial at Wood Green station, the first in-truss installations would begin in late 2021, following a period of design and procurement of parts.

Members requested that for further submissions to the Committee, the Equality Impact Assessment be included as a background paper.

The Committee noted the paper and approved additional Programme and Project Authority of £22.4m, giving a total Programme and Project Authority of £885.13m, for continued renewal of escalators from 2020/21 to 2022/23.

66/10/19 London Underground Railway Systems Enhancements Programme

David Hughes introduced the paper, which updated the Committee on progress with delivery of the London Underground Railway Systems Enhancements (RSE) Programme, formerly known as the World Class Capacity Programme. The updated name of the Programme better reflected its aim, which was to deliver a service capacity increase on the Victoria, Jubilee and Northern lines.

The Victoria Line Upgrade 2 was completed and financially closed in July 2019. The RSE Programme would deliver up to 32 trains per hour during peak periods on the Jubilee line between West Hampstead and North Greenwich and 31 trains per hour during peak periods on the Morden branch of the Northern line. Increased capacity on the Morden branch would also deliver a small improvement in peak capacity on the Bank branch. The Programme deliverables would enable the introduction of services on the Battersea branch upon completion of the Northern line extension.

The Committee noted the paper.

67/10/19 Air Quality and Environment

David Hughes introduced the paper, which updated the Committee on the delivery of the Ultra Low Emission Zone Expansion (ULEX) 2021, Low Emission Zone 2020 (LEZ 2020), HGV Safety Permit Scheme (Direct Vision Standard (DVS)), the Camera refresh project and associated scrappage schemes. The paper sought additional Procurement Authority to extend and vary the contract with Capita Business Services Limited for the development of the back-office system elements for the aforementioned schemes and projects. The Programme was key in delivering aspects of the Healthy Streets Approach, outlined in the Mayor's Transport Strategy.

The Committee noted that the HGV Direct Vision Standard Registration Launch was on 28 October 2019, not 26 October 2019 as stated in Table 3 of the report.

Members asked that officers communicate with the Chief Executive Officer of Motability regarding the five-year exemption from the Ultra Low Emission Zone (ULEZ) charge until 26 October 2025 for vehicles in the disabled or disabled passenger tax class. Members stated that five-year leases were being given on vehicles that were not ULEZ compliant.

A briefing on Air Quality and Environment was requested before the next meeting of the Committee.

[Action: David Hughes]

The Committee noted the paper and the exempt supplementary information on Part 2 of the agenda and approved additional Procurement Authority, as set out in the paper on Part 2 of the agenda, to extend and vary the contract with Capita Business Services Limited for the development of the back-office

system elements for ULEZ Expansion 2021 (ULEX), LEZ 2020, HGV Safety Permit Scheme (DVS), Camera Refresh Project and associated scrappage schemes.

68/10/19 TfL Growth Fund

Lucinda Turner introduced the paper, which updated the Committee on the TfL Growth Fund and sought a reduction in Programme and Project Authority of £18m, from £200m to £182m.

The Growth Fund was designed to unlock homes and regeneration in areas of London where transport acted as a constraint and played a core role in delivering the objectives of the Mayor's Transport Strategy (MTS) and London Plan. Specifically, the Growth Fund aimed to support sustainable transport schemes that directly unlocked homes and jobs and supported transport outcomes that aligned with the MTS and delivered benefits in terms of step-free access, Healthy Streets and passenger improvements. The Growth Fund also enabled TfL to leverage funding to maximise the impacts of TfL funding and ensure development and other sources were contributing an appropriate share.

In terms of the Investment Programme, the Growth Fund made up less than two per cent of the Programme but punched above its weight in what it delivered; the Growth Fund was able to leverage third party funding worth over three times the cost of the Programme itself.

The reliance on third parties for the delivery of benefits had often caused challenges that led to slippage. TfL took an active management approach to enable quick responses to changes in project circumstances and ensure funding was focussed on where it could best deliver the Fund's objectives.

To ensure successful delivery, all projects had to undertake proportionate monitoring across multiple stages of project delivery, the measures for which were derived from the Fund objectives and the Scheme Assessment Criteria.

In 2019/20 the Growth Fund had helped to deliver new public transport capacity and leverage third party funding through: increased capacity and the delivery of step-free access at White Hart Lane station, which was completed in summer 2019; the delivery of step-free access at Barking Riverside Overground station, set to open in 2021; the scheduled new southern entrance at Ilford station in 2020; a contribution of £5m to secure the release of £14m Section 106 funding from the London Borough of Barnet at Colindale station; and supported the Housing Infrastructure Fund bids for £291m to increase the capacity of the DLR and £81m to deliver improvements along the East London line.

TfL endeavoured to ensure that projects and schemes aligned with the new Draft London Plan and was working with the Greater London Authority and the boroughs to ensure alignment. Many boroughs were already fully aligned but the Growth Fund was helpful in ensuring they also aligned to the MTS. Through the Growth Fund, TfL was selective about how resources were allocated, to optimise third party leverage, but maintained a level of flexibility in how resources were allocated.

Members asked whether the Growth Fund could be used to fund projects and schemes such as zero carbon homes. Lucinda Turner told the Committee that the delivery of zero carbon homes was part of the wider planning process, but TfL was very aware of the need for zero carbon homes.

The Committee stated that the Growth Fund helped to unlock the delivery of projects or schemes that worked towards the MTS but might not happen otherwise.

The Committee noted the paper and the related paper on Part 2 of the agenda and approved the reduction in Programme and Project Authority, from £200m to £182m.

69/10/19 Member suggestions for future agenda discussions

Andrea Clarke introduced the item and the Committee's updated forward programme.

During the course of the meeting, Members requested briefings on Air Quality and Environment, Energy Efficiency and Accessibility and Inclusion.

There were no additional suggestions raised for future discussion items for the forward programme or for informal briefings.

The Committee noted the forward programme.

70/10/19 Any Other Business the Chair Considers Urgent

There was no other urgent business.

71/10/19 Date of Next Meeting

The next scheduled meeting of the Committee would be held on Wednesday 18 December 2019 at 10.15am.

72/10/19 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 – Quarter 2 2019/20; Air Quality and Environment; and TfL Growth Fund.

The meeting closed at **1.00pm.**

Chair: _____

Date: _____

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Programmes and Investment Committee



Date: 18 December 2019

Item: Matters Arising and Actions List

This paper will be considered in public

1 Summary

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

2 Recommendation

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

List of appendices to this report:

Appendix 1: Actions List

List of Background Papers:

Minutes of previous meetings of the Programmes and Investment Committee.

Contact Officer: Howard Carter, General Counsel

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Programmes and Investment Committee Action List (reported to the meeting on 18 December 2019)

Actions from the meeting of the Programmes and Investment Committee held on 23 October 2019

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	On Forward for Customer Service and Operational Performance Panel.
60/10/19 (2)	Investment Programme Report – Quarter 1 2019/20: Jubilee line fleet The Committee heard that recent disruption to the Jubilee line service was a result of cracks being found in a coupling plate between carriages... TfL apologised for the inconvenience caused to customers. Members would be updated when more detail was available.	Andy Lord	December 2019	A note will be provided to the Committee, prior to the meeting.
60/10/19 (3)	Investment Programme Report – Quarter 1 2019/20: cycle infrastructure In May 2019, the length of protected cycle infrastructure surpassed the 2016 baseline of 53km, with 112km complete or under construction. To what extent that distance of cycle infrastructure was completely separated from traffic would be confirmed to Members following the meeting.	David Hughes	October 2019	Complete.
60/10/19 (4)	Investment Programme Report – Quarter 1 2019/20: energy efficiency Members requested that greater detail on energy be included in future reports.	Alex Williams	December 2019	This will be included in future reports.

Minute No.	Description	Action By	Target Date	Status note
	A briefing on energy efficiency and energy strategy was requested.			Complete. A briefing was held in December 2019.
67/10/19	Air Quality and Environment: briefing A briefing on Air Quality and Environment was requested before the next meeting of the Committee.	David Hughes	December 2019	Complete. A briefing was held in December 2019.

Actions from previous meetings of the Committee

Minute No.	Description	Action By	Target Date	Status note
41/07/19	Investment Programme Report – Quarter 4 2018/19: energy efficiency programmes An overview paper, which pulled together all the energy efficiency issues and solutions of the programme, would be brought to a future meeting of the Committee		December 2019	This has been incorporated into the paper on Air Quality and Environment.
49/07/19	Crossrail Update: project costs and forecasts Following approval of the revised delivery schedule, Crossrail Limited's immediate focus was to transition the high-level programme into a detailed Delivery Control Schedule and develop the resultant final cost forecast. An updated baseline of project costs and forecasts would be provided when available.	Simon Kilonback	December 2019	Information was provided at the Board meeting in November. An update paper is on this agenda.
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	Alex Williams	January 2020	A note on Privacy and Data Security will be provided.

Minute No.	Description	Action By	Target Date	Status note
	Air Quality Management schemes spread over a wider geographical area. Members requested that a briefing be provided on privacy and data security.			
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	March 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	March 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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Programmes and Investment Committee



Date: 18 December 2019

Item: Crossrail Update

This paper will be considered in public

1 Summary

- 1.1 This paper provides an update on the status of the Crossrail project including the readiness of the Infrastructure Managers (IM) for the operations and maintenance of the railway after handover from the Crossrail project.
- 1.2 The paper also provides an update on the periodic reports from the Project Representative (P-Rep) on Crossrail.
- 1.3 It also provides an overview of the independent cost review commissioned with the Department for Transport (DfT) as joint sponsors.
- 1.4 On 27 March 2019, the Board delegated authority to the Committee to take decisions on matters reserved to the Board in relation to the Crossrail Project.
- 1.5 Under that delegated authority, at its meeting in July 2019, the Committee considered and approved the recommendations in a paper on a proposal by Crossrail Limited (CRL) to revise the staff rates and replace the current incentive scheme in the Project Delivery Partner (PDP) Services Contract with a new incentive schedule that support the delivery of the revised schedule. As a change to the PDP contract, it required the approval of the Crossrail Sponsors.
- 1.6 The July 2019 paper on the PDP contract noted that discussions with Bechtel Limited were not complete and, subsequently, some of the points of detail previously under consideration have not been finally agreed with Bechtel and it is, therefore, appropriate to seek a revised approval from the Committee.
- 1.7 A paper is included on the Part 2 agenda which contains supplementary information that is exempt from publication by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL.

2 Recommendation

- 2.1 **The Committee is asked to note the paper and the supplementary paper on Part 2 of the agenda and to approve the changes proposed by Crossrail Limited to the current Final Incentive Scheme contained within the Project Delivery Partner Services Contract with the Crossrail Project's revised opening programme, as described in the papers.**

3 Crossrail update

- 3.1 Health and safety remains CRL's number one priority and overall performance remains under scrutiny. With every incident, CRL will establish the root causes of the incident and will share the learning across the programme and with the wider industry.
- 3.2 Stepping up Week was held in November with a dedicated programme of activities for health and safety across the whole of the Crossrail programme. This was a successful week featuring workshops, presentations, guest speakers, site engagement visits and training sessions, all hosted and led by the Supply Chain Project Teams.
- 3.3 The Health and Safety Executive and Office of Rail and Road recently conducted a planned joint inspection at Bond Street and Liverpool Street stations. The outcome was very positive with no improvements requested or formal interventions made on site.
- 3.4 The Crossrail project has made good progress over recent months as the new plan to complete the Elizabeth line is implemented by the supply chain. CRL's latest assessment is that the opening of the central section will not occur in 2020, which was the first part of the previously declared opening window. The Elizabeth line will open as soon as practically possible in 2021 and CRL will provide Londoners with further certainty about when the Elizabeth line will open early in 2020.
- 3.5 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 quality standards to ensure the reliability of the railway from day one of passenger service. Nearly 200,000 documents need to be completed as part of the assurance and handover process and safety certification for the Elizabeth line.
- 3.6 Whitechapel station has reached the Staged Completion 1 point which means the station meets the requirements for Trial Running. 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 delivery process.
- 3.7 CRL has developed a Handover Strategy and Plan which sets the way forward to produce 30 individual Handover Execution Plans (HEPs) for each Station, Shaft, Portal and Railway System. The HEPs set out the configuration of each element of the railway at each stage of completion. The strategy is based on starting Trial Running as soon as possible. Mile End Shaft, Royal Oak portal and Custom House station are due to be handed over early in the new year.
- 3.8 Significant work has taken place within the tunnel to support readiness for Trial Running, including connecting the central section to the GSM-R (the national railway radio system) and assurance by the London Fire and Emergency Planning Authority of the public address system which is now in use in the majority of the tunnel.

- 3.9 CRL has identified the need for more time to complete software development for the signalling and train systems and the safety approvals process for the railway. The Trial Running phase is still expected to begin at the earliest opportunity in 2020, followed by testing of the operational railway to ensure it is safe and reliable.
- 3.10 Testing of the train and signalling software is ongoing in the central section with Siemens software configuration (PD+10). Each new version of the software increases functionality and the range of Dynamic Testing that can be undertaken. The next software version (PD+11) is still anticipated to be the version used for the start of Trial Running however CRL will gain further certainty around this once testing begins with this software configuration later in December.
- 3.11 The Commissioner and the CRL executive team visited the Siemens facilities in Germany last week to get an update on the testing, software development and assurance. The day was an opportunity to see first-hand some of the complex works being undertaken to deliver the signalling system for the Central Operating Section.

4 Operational Readiness

- 4.1 TfL and MTR-Elizabeth Line are on course to start operating the stopping services from Paddington mainline station to Reading on 15 December 2019 under the TfL Rail brand (referred to by the project as Stage 5A). The service will start with the seven-car units currently used between Liverpool Street and Shenfield and the full-length units will be swapped in when available.
- 4.2 As we prepared for the takeover of stopping services between Paddington mainline and Reading on 15 December, TfL Rail trains are running on some Great Western Railway (GWR) operated stopping services. The services operated by the TfL Rail train are still GWR services and all GWR conditions, fares and concessions continue to apply. This will allow GWR to reallocate some of their trains and allow for a smooth introduction of TfL Rail services in December.
- 4.3 To achieve the necessary levels of competence in maintenance delivery ahead of further handovers, the Maintenance and Training teams are using the sites that have been handed over. The Maintenance team is also providing track inspection support to the Crossrail contractors to become familiar with the assets and locations prior to becoming the Infrastructure Manager. We are also preparing to provide maintenance support on the systemwide elements ahead of handover. This will enable the maintenance team to gain valuable hands-on experience, familiarisation and readiness.
- 4.4 Further training is being carried out for Traffic Managers to allow sufficient flexibility to operate the railway. In addition, an updated training programme is planned to cover any skills gaps due to agreed changes to functionality of the railway.
- 4.5 CRL continues to provide support to Siemens in Germany to test the latest software to ensure updates to the training simulator are fit for purpose when installed in the control centre in Romford.

- 4.6 Network Rail station enhancement works continue at Southall, Hayes & Harlington, West Drayton, West Ealing, Ealing Broadway and Acton Main Line and are on track for completion in late 2020. Key construction works will be undertaken over the Christmas period as part of the Station Enhancement works on the west of the route. These works include installation of platform structures and link bridges at Acton Main Line and West Ealing, and access structures on Platform 4 at Ealing Broadway.
- 4.7 At Ilford and Romford, station enhancement works are ongoing and currently forecast for completion in December 2020 / early 2021.
- 4.8 NR is progressing with the Great Eastern Main Line traction power upgrade with a target completion date of May 2020. Contract awards for remaining scope required to support the running of trains from Shenfield directly into the central tunnels are currently being programmed.

5 Project Representative

- 5.1 The Project Representative (P-Rep) is in place for the purpose of providing the Sponsors with oversight of project delivery, advising and raising points of the challenge to the Sponsors and scrutinising progress.
- 5.2 In line with the KPMG recommendations and the commitments made by the Mayor for greater transparency of the Crossrail project, the most recent P-Rep reports are now included as part of the regular update to the Committee. We have already published the reports from 2018/19 and the first five Periods of 2019/20. The next two reports are now available on our website¹.
- 5.3 As with all the P-Rep reports, it has been necessary to make some redactions to the reports prior to publication to protect commercially sensitive material. We have sought to keep such redactions to a minimum. Unredacted versions of the most recent P-Rep reports have been included in the paper on Part 2 of the agenda.
- 5.4 In the most recent reports, P-Rep highlighted the following key areas of concern:
- (a) the increasingly large number of issues with respect to handover paperwork and engineering assurance documentation and the alignment of current levels of production with the dates in the Delivery Control Schedule (DCS); and
 - (b) the timeline for having a detailed cost and schedule for the period of the project post entering into Railways and Other Guided Transport Systems (ROGS).
- 5.5 The P-Rep observations are shared with CRL and discussed in detail by CRL, P-Rep and the Sponsors at the regular meetings of the Crossrail Sponsor Board. The Sponsors have asked that CRL produce a response to the P-Rep report. The response from CRL is included with the P-Rep reports on our website (with an unredacted version being included in the paper on Part 2 of the agenda).

¹ <https://tfl.gov.uk/corporate/publications-and-reports/crossrail-project-updates>

6 Independent cost review

- 6.1 At the meeting of the Board of CRL on 7 November 2019, the Board identified the need for more funding to complete the project including complex testing of trains and managing the handover of the railway safely and reliably into passenger service.
- 6.2 CRL's detailed cost forecasts continue to show that the project's costs will increase due to programme risks and uncertainties. The latest projections indicate a range of between £400m to £650m more than the revised funding we agreed with the Mayor and Government in December 2018². We are in discussions with the DfT and GLA regarding how funding of these additional costs will be resolved.
- 6.3 The DfT and TfL, as joint sponsors, commissioned KPMG to carry out an independent review of CRL's financial projections in the autumn of 2018. That report was used to inform the negotiation of the loan agreements, necessary to continue the project.
- 6.4 The joint sponsors have now commissioned KPMG to provide an updated view of their previous cost scenarios, taking into account the cost and schedule analysis that CRL presented to its Board on 7 November 2019. Once available, Sponsors will compare KPMG's findings with the views of the P-Rep and the Crossrail Executive, in order to determine the scale of the revised funding facility to be negotiated.
- 6.5 KPMG has recently received the significant volume of analysis presented by CRL to its Board. The joint sponsors have asked that KPMG concludes its work as a priority and it is expected that KPMG will report back in the coming weeks. We expect to provide an update to the Board at the next meeting on 22 January 2020.

7 PDP contract

- 7.1 The background to the proposals for changes to the PDP contract was set out in the paper to the Committee in July 2019 and remains unchanged.
- 7.2 The proposed revisions to the transaction described in that paper are set out in the supplemental information contained in the paper on Part 2 of the agenda.

² <https://tfl.gov.uk/info-for/media/press-releases/2018/december/new-financing-agreement-confirmed-for-crossrail-proje>

List of Appendices:

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

List of Background Papers:

Committee paper 17 July 2019 “Crossrail – Project Delivery Partner Incentive Scheme”

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Date: 18 December 2019

Item: **Strategic Risk Update - Opening of the Elizabeth Line (SR16)**

This paper will be considered in public

1 Summary

- 1.1 This paper provides an update on TfL's governance arrangements for the management of the Level 0 pan-TfL Strategic Risk relating to opening the Elizabeth line (SR16).
- 1.2 SR16 describes the key risks to the timely opening of the Elizabeth line from a TfL perspective as Joint Sponsor and this paper sets out the governance arrangements for the mitigation of those risks.

2 Recommendation

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

3 Risk Assessment

- 3.1 The purpose of risk assessment and analysis is to provide an input to risk evaluation, helping to decide on whether risk needs to be treated and how, and on the most appropriate risk treatment strategy and methods.
- 3.2 The Enterprise Risk Assessment Matrix (ERAM) provides a consolidated and consistent approach to assessing the probability and impact of all identified risks. The ERAM is a semi-quantitative risk assessment scheme consisting of probability and impact ranges. There are five levels for both probability and impact: 1: Very Low, 2: Low, 3: Medium, 4: High and 5: Very High.
- 3.3 The ERAM covers four impact categories; Health, Safety and Environment (HSE), Customers & Stakeholders, Finances and Stakeholder Confidence.
- 3.4 The risk to the timely opening of the Elizabeth line (SR16) has been assessed against all four impact categories. Scoring each impact category helps in determining whether the risk is within acceptable corporate tolerance levels. Controls and mitigation actions must aim to reduce the exposure of risks scored outside of corporate tolerance.
- 3.5 The following table outlines the assessment of the potential impacts and probability of SR16 using the four impact categories. The assessment is carried out for the current assessment and target state following implementation of identified actions. The full outputs of the ERAM are attached.

Risk impact categories	Assessment of potential impacts of SR16	
	Current assessment of potential impacts	Target assessment of potential impacts
Health, Safety & Environment	Insignificant health issues, injuries, or localised environmental harm. Medium probability of 25% to <50%	Insignificant health issues, injuries, or localised environmental harm. Low probability of 5% to <25%
Customer / Stakeholder	Catastrophic failure or gross negligence resulting in an inability to deliver multiple services and/or a total loss of assets or inability to deliver significant elements of the MTS. Medium probability of 25% to <50%	Major impact to service delivery, assets, or delivery of the MTS Low probability of 5% to <25%
Finance	≥£50m Medium probability of 25% to <50%	£10m to <£50m Low probability of 5% to <25%
Stakeholder Confidence	Extensive ongoing negative media coverage resulting in major loss of confidence with significant regulator or stakeholder intrusion or loss of licence to operate Medium probability of 25% to <50%	Ongoing negative media coverage resulting in loss of confidence with significant regulator or stakeholder intrusion Low probability of 5% to <25%

4 Consequences

Consequences

- 4.1 The following table summarises the possible consequences to TfL of delays to the opening of the central section between Paddington and Abbey Wood.

Title	Description
Cost	CRL exceed budget to deliver the line
Revenue	Adverse revenue impact from delayed opening of the line
Credit rating	Reduction in our credit rating
Stakeholder confidence	Negative impact on TfL's ability to continue both project and service delivery
DfT confidence	DfT confidence in TfL's ability to commission a railway network

- 4.2 Some of the current impacts and actions are detailed below following the latest announcements from CRL that the Elizabeth line will open as soon as practically possible in 2021 and that their latest projections indicate a range of between £500m to £750m more than the revised funding we agreed with the Mayor and Government in December 2018.

Cost review

- 4.3 TfL and the DfT jointly commissioned KPMG to provide an updated view of their previous cost scenarios, taking into account the cost and schedule analysis that CRL presented to its Board on 7 November 2019. Once available, Sponsors will compare KPMG's findings with the views of the P-Rep and the Crossrail Executive, in order to determine the scale of the revised funding facility to be negotiated.

Revenue

- 4.4 In the 2018 Business Plan, we made a cautious assumption of the impact of the anticipated delay on our revenue forecast over the plan period. For the 2019 draft Business Plan, we have included a further forecast reduction to revenues of £500m - £750m to reflect a cautious scenario. Our net cost of operations reflects this further revenue loss, the peak impact of which is in 2021/22 and 2022/23. Revised demand assumptions, repurposing of capital business rates and operating business rate retention indexation to support the mitigation of internal cost pressures and lost revenue from delayed Elizabeth line, will allow this to be managed to maintain breakeven in 2022/23.

Credit rating

- 4.5 Shortly after the announcement of the delay in opening of the Elizabeth line in August 2018, S&P Global Ratings (S&P) put the ratings on CreditWatch negative. Following the announcement of a financing package to cover additional capital costs related to the delayed opening of the Elizabeth line and the publication of TfL's Business Plan in December 2018, S&P affirmed its 'AA-/A-1+' issuer credit ratings and changed the outlook from 'stable' to 'negative'.
- 4.6 Rating agencies were informed of the revenue impact of the additional delays after the TfL Board on 20 November 2019. This was not followed by any further rating action from our agencies. Our long-term credit ratings therefore still stand as follows:
- S&P: AA- / negative outlook;
 - Moody's: Aa3 / stable outlook;
 - Fitch: AA- / rating watch negative.

5 Controls

- 5.1 The key controls that have been incorporated into the project include defining the corporate responsibilities, the ability of TfL to provide an oversight role, the capability of CRL to deliver, and an opening strategy that breaks the railways into manageable components and additional oversights and reviews.

Corporate Governance

- 5.2 Crossrail Limited, established in 2001, is the company that has been set up to build the new railway that will become known as the Elizabeth line when it opens through central London. It is our wholly owned subsidiary and the project is jointly sponsored with the Department for Transport (DfT).

- 5.3 CRL is responsible for developing, designing, procuring, constructing, commissioning, integrating, and completing the Crossrail Project including the procurement, testing and commissioning of rolling stock and depot.
- 5.4 Joint Sponsors, as clients for the railway, are accountable for the overall programme, Sponsors' requirements and the opening of the railway.
- 5.5 After the announcement in August 2018 that the Elizabeth line would not open in December 2018, the Mayor asked us, on behalf of the Joint Sponsors to commission independent reviews into the Crossrail project's governance. The review was undertaken by KPMG to ensure that the right scrutiny and oversight are in place. The review was completed in January 2019 and published on our website.
- 5.6 Sponsors and CRL worked together on a prioritised action plan to implement the recommendations as soon as practicable. Implementing the recommendations has strengthened the governance and assurance of the project as well as increased oversight, transparency and scrutiny at all levels. Taking on board KPMG's recommendations has enhanced the level of rigour and robustness in the methods being applied by CRL to their development of the revised cost and schedule baseline. A joint response was prepared to outline the actions taken to implement the recommendations made by KPMG and was presented to our Audit and Assurance Committee in June 2019.

TfL oversight

- 5.7 We have an active oversight role with CRL to monitor and report on the progress of the project. We provide an update to each meeting of the Board and Programmes and Investment Committee where the CRL CEO and Chair attend to discuss progress and answer questions. We have also reported to the Audit and Assurance Committee on the transition arrangements and status of implementing the KPMG recommendations.
- 5.8 The table below outlines the regular engagement between TfL and CRL that enables us to stay informed with the progress and challenges faced on the project.

Title	Description
Elizabeth line Readiness Board	Periodic Chaired by: Mike Brown, Commissioner Provides visibility on key issues and risks to senior members of TfL to ensure a smooth transition from the delivery to operational phases of the project
LU Readiness Steering Group	Periodic Chaired by: Andy Lord, Managing Director, LU Oversee LU's operational readiness for the implementation of the Elizabeth line and approve operational changes
Elizabeth line communication steering group	Quarterly Chair: Vernon Everitt, Managing Director, TfL Customer, Communications, Technology Discuss, resolve and escalate communication and stakeholder confidence issues and make decisions on the

Title	Description
	communications aspects from a TfL point of view.
CRL Board	Periodic Senior Representatives of both Sponsors (including Mike Brown, the Commissioner) attend a dedicated section of the CRL Board where a debrief of the board discussions is shared. Going forward, TfL's group CFO will start to attend the entire CRL Board meeting.
CRL Board non-executive directors (NED)	Periodic Both Sponsor organisations have nominated non-executive directors appointed to the CRL Board who take an active part in the governance of CRL. We have three nominated NEDs, two being also members of the TfL Board.
Sponsor Board	Periodic Attended by both Joint Sponsors and CRL executive to discuss and resolve matters relating to the project. Meeting is divided into Sponsor only session followed by CRL joining the second part.
Joint Sponsor Team	Included members from both Sponsor organisations. Carries out the business of Sponsors and provides an oversight role across the project.
Project Representative (P-Rep)	Provides the Sponsors with oversight of project delivery, advising and raising points of the challenge to the Sponsors and scrutinising progress

- 5.9 CRL has also improved its reporting, revised its periodic Board reports, developed weekly dashboards and introduced a Visual Management process which is reported daily at site level to enable more accurate and informed analysis. These changes provide greater clarity of progress reported, risk identification and management, and other areas that may require action or mitigation.

CRL capability to deliver

- 5.10 CRL has worked to re-establish its capability to deliver and the effectiveness of its governance structures, assurance and oversight following a period of demobilisation in 2018. A new leadership team was put in place in November 2018 and has overseen an intensive review of the programme.
- 5.11 A reinvigorated corporate governance layer has also been installed including the creation of an Executive Group, an Investment Committee, a re-established Audit and Assurance Committee, a merged Remuneration and Nomination Committee and a strengthened Safety and Health Executive Leadership Team (SHELT) all with new Terms of Reference. CRL has also developed a programme-wide Integrated Audit and Assurance Plan (IAAP) which clearly defines CRL's approach to assurance and the structure of their Three Lines of Defence framework. CRL are also revising its programme governance structure in line with its revised operating model.

- 5.12 CRL has reviewed its capacity and capability across the programme, establishing a Systems Integration team with a strong lead to define the actions required to develop the new schedule as well as increasing its project controls, planning and risk teams and strengthening its oversight of delivery, risk-management and reporting. This, coupled with CRL's Visual Management process, has improved visibility and management of progress and productivity, which is key to understanding the barriers to efficient delivery and putting in place the necessary tools to deliver the remainder of the programme.
- 5.13 The following table outlines some of the main areas where CRL is working to maintain the capability to deliver the remainder of the programme.

Title	Description
Programme reporting	Weekly programme reporting. Daily and weekly vis management
Systems integration	Organisation focussed on Systems Integration with dedicated resources.
Competencies of operational staff	Work with contractors to maintain competencies of operational staff
Critical resources	Ensure key CRL resources are retained through to completion. Weekly review of critical role status and occupancy
Main contractor liaison	Strengthened commercial and project management arrangements in place
Strengthened CRL Board	New CRL Board membership supported by greater scrutiny of project progress

Staged opening

- 5.14 In order to provide a timely and reliable train service for our passengers, the Elizabeth line is planned to open in five stages. The phased introduction of services allows us to introduce passenger benefits as they are available, including new rolling stock and station facilities. In addition, our ability to provide a reliable service for each subsequent stage is increased by accumulating operational time for our rolling stock and experience of our drivers, station staff and operators.
- 5.15 Stages 1 and 2 are already in operation as TfL Rail between Liverpool and Shenfield in the east and between Paddington and Hayes & Harlington/Heathrow in the west. To mitigate some of our revenue losses from the delayed opening, we are on course to start operating the stopping services from Paddington mainline station to Reading on 15 December 2019 (referred to by the project as Stage 5A). TfL Rail is a high performing service and meets/exceeds targets for punctuality, customer satisfaction, step-free access and ticketless travel.
- 5.16 Stage 3 is bringing into use of the central section (between Paddington and Abbey Wood/Stratford) and when the service will be known as the Elizabeth line.
- 5.17 Once the central section opens, full services across the Elizabeth line from Shenfield in the east (Stage 4) and Reading and Heathrow in the west to Abbey Wood (Stage 5), will commence as soon as possible.

6 Conclusion

- 6.1 CRL continues to be responsible for the delivery of the end-to-end railway that is safe and reliable for our passengers though greater certainty around the schedule and cost requirements is required.
- 6.2 Challenges have been identified in the handover process and in maintaining production across the programme as the projects complete the remaining work in parallel: finishing construction activities, completing testing and assurance requirements, and preparing for handover to the Infrastructure Managers. Management of the impacts to cost and schedule remain the highest priority after safety for Crossrail Executive and the Board.
- 6.3 A number of steps have been identified to further strengthen the governance and performance of the remainder of the project including:
- (a) the assignment of the lead ownership of the Strategic Risk relating to Opening of the Elizabeth Line (SR16) to the Managing Director, London Underground to ensure a clear focus on handover and operational readiness;
 - (b) holding a coordinated strategic workshop between CRL, TfL and Network Rail to ensure a common understanding of the risks to completion and interdependencies;
 - (c) further consideration of the arrangements for practical and operational handover of stations and infrastructure to TfL;
 - (d) further strengthening of the management oversight of preparations for handover and operational readiness within TfL; and
 - (e) the preparation of a Governance Transition Plan to ensure the effectiveness of the transition off CRL to TfL as completion of the project progresses.
- 6.4 Significant interventions have been made to the governance and oversight of Crossrail since August 2018. The controls currently in place and the additional activities outlined above are considered adequate for the management and oversight of the risk of further delays to the opening of Elizabeth line services. Although challenges remain on the programme and disappointing news may still be reported, the increased transparency and enhanced engagement between organisations should enable us to plan and mitigate the effects of these events.

List of Appendices to this paper:

Appendix 1: Enterprise Risk Assessment Matrix, SR16 Opening of the Elizabeth line

List of Background Papers:

None

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RISK DETAILS

Risk Level:

Stakeholders:

Risk Owner (Accountable):

Responsible Manager:

Business Area:

Risk Title:

Risk Description:

MTS / Corporate Strategy:

Panel / Committee oversight:

Risk ID (ARM):

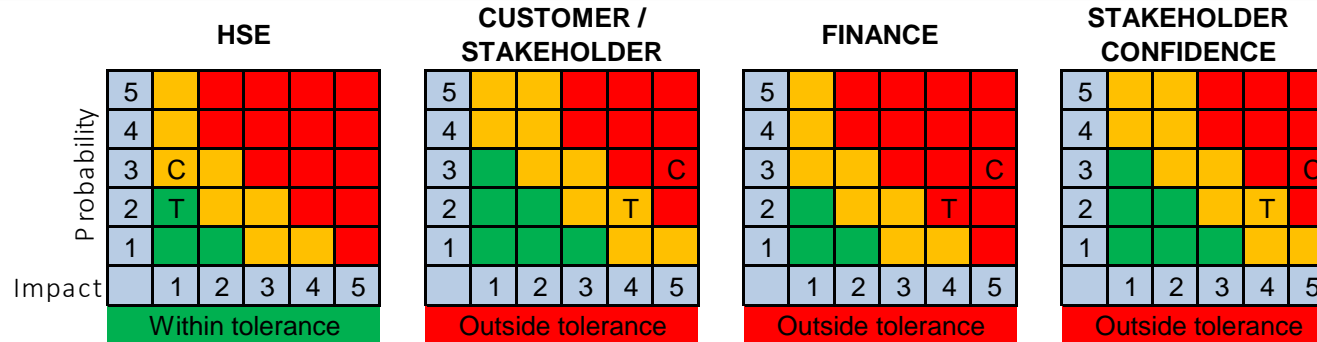
Objective:

Doc Version:

Overall Control Effectiveness Rating:

Last update:

RISK ASSESSMENT



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	CURRENT		TARGET		ASSESSMENT RATIONALE
	Assessment	Score	Assessment	Score	
Probability:	3: Medium: 25% to <50%	3	2: Low: 5% to <25%	2	
HSE:	1: Very Low	1	1: Very Low	1	
Customer/Stakeholder:	5: Very High	5	4: High	4	
Finance (£m):	5: Very High: ≥£50m	5	4: High	4	
Stakeholder Confidence:	5: Very High	5	4: High	4	
Overall Risk Rating:	22		14		

Key Risk Indicator	Location
T-minus process tracker (go/ no-go)	TBC
Regular reporting	
Daily Vis	

PRE-RISK EVENT

CAUSES	
Title	Description
Systems Complexity	Complex design and software configuration
Testing & Commissioning	Testing & Commissioning issues. Issues with Systems Integration
Reliability	Poor reliability of systems, incl. train /software prolongs testing and/or ability to bid Stages 4 /5B timetables prior to Stage 3 operation
Delay Recovery	Contractors inability to recover delays or major dispute with a contractor
Operators readiness	Programme elongation impacts staff and skills retention. Poor supplier contract performance.
Contractual arrangements	Incomplete information available (e.g. asset information) to support operational activities
Emergency Situations	Emergency situations e.g. fire, serious rail incident

CONTROLS (preventative)			Control Effectiveness		Assurance
Title	Description	Owner	Design	Operation	1st/2nd/3rd line
TfL readiness board	TfL Readiness Board to assure commissioner of level of TfL readiness and structure below it	Brown, Mike	Effective	Effective	1st line
LU readiness board	LU Readiness Steering Group to monitor progress to readiness and decide on prioritization of issues	Smith, Howard	Effective	Effective	1st line
Sponsor Board	Sponsor Board	Hughes, David	Effective	Effective	1st line
Programme reporting	Weekly programme reporting. Daily and weekly vis management	Wild, Mark	Effective	Effective	1st line
Systems Integration	Organisation focussed on Systems Integration with dedicated resources.	Wild, Mark	Effective	Effective	1st line
Competencies of Operational Staff	Work with contractors to maintain competencies of operational staff	Smith, Howard	Effective	Effective	1st line
Critical resources	Ensure key CRL resources are retained through to completion. Weekly review of critical role status and occupancy	Wild, Mark	Effective	Effective	1st line
Main contractors liaison	Strengthened commercial and project management arrangements in place	Wild, Mark	Effective	Effective	1st line
Strengthened CRL Board	New CRL Board membership supported by greater scrutiny of project progress	Sponsor	Effective	Effective	1st line

ACTIONS					
Title	Description	Owner	Start Date	Due Date	Status
Programme schedule and cost	Change control as required to DCS1.0 baseline, establish any financial impacts and agree any actions required with Sponsors.	Wild, Mark		30/11/2019	In Progress
Operational reliability	Strengthen team focused on reliability and implement plans for building and forecasting reliability growth to support passenger operation	Smith, Howard	01/04/2019	31/01/2020	In Progress
T-minus	Broaden readiness tracker to embed T-minus to Trial Running across the programme, and strengthen controls confidence to timely completion of Handover milestones/activities	Smith, Howard	01/10/2019	01/12/2019	In Progress
Operational contingency plans	Establish/update detailed operational readiness activities based on learnings from Handovers already taken plan and review contingency plans for operations	Smith, Howard	01/10/2019	01/02/2020	In Progress

POST-RISK EVENT

CONSEQUENCES		Insurance		Quantified Financial Impact		
Title	Description	Type	Excess	Minimum	Most Likely	Maximum
Revenue	Adverse revenue impact from delayed opening of the line					
Stakeholder confidence	Negative impact on TfL's ability to continue both project and service delivery					
Credit rating	Reduction in our credit rating					
DfT confidence	DfT confidence in TfL's ability to operate a railway network					
Cost	CRL exceed budget to deliver the line					

CONTROLS (corrective)			Control Effectiveness		Assurance
Title	Description	Owner	Design	Operation	1st/2nd/3rd line
Programme reporting	Daily visualisation and weekly reporting capturing details of progress towards readiness	Wild, Mark	Effective	Effective	1st line
Governance	Independent expert panel appointed	Wild, Mark	Effective	Effective	1st line
Funding	Regular liaison with Government over funding requirements	Kilonback, Simon	Effective	Effective	1st line

ACTIONS					
Title	Description	Owner	Start Date	Due Date	Status
Contingency comms plan	Effective decision making around completion dates and communication plans to be in place well ahead in case of delays to the EL opening	Everitt, Vernon		Until completion	In Progress
Revenue stream	Takeover of services from Paddington mainline to Reading in line with original plan. Strengthen TfL Rail services to more closely reflect Stage 4 service / timetable	Smith, Howard		15/12/2019 & 31/5/20	Proposed

Programmes and Investment Committee



Date: 18 December 2019

Item: Investment Programme Report – Quarter 2, 2019/20

This paper will be considered in public

1 Summary

1.1 The Investment Programme Report describes the progress and performance in Quarter 2, 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 2, 2019/20.

List of Background Papers:

None

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Transport for London investment programme report

Quarter 2 2019/20 (23 July – 14 September 2019)



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.

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Please note that safety and sustainability information will no longer be referenced in this report. There is a quarterly Safety, Sustainability and Human Resources Report published on our website, which provides an overview of health, safety and environmental performance for London Underground, TfL Rail, Surface Transport and Crossrail services.

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) to the Programmes and Investment Committee.

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 includes progress on 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 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 2018 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.

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 be seeking 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, which represents 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):





London Overground at Gunnersbury station

Strategic milestones for 2019/20 – the key milestones listed in the TfL Budget – are detailed in the Appendix (page 96).

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

- Major projects is responsible for our largest and most complex projects. It comprises line upgrades, the Piccadilly line upgrade, network extensions, and major stations, which are covered in pages 20-35 of this report. Future projects (see page 37) 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 in pages 38-49
- Surface Transport comprises Healthy Streets, air quality, public transport, and asset investment. These are covered in pages 50-79
- Other comprises technology and data, TfL Growth Fund, and the Elizabeth line (including Crossrail), which are covered in pages 80-95

Tragic incident at Waterloo

We would like to start this report with a tribute to one of our colleagues, Christian Tuvi, who tragically died as a result of an injury received while working for one of our contractors, Cleshar, at Waterloo Underground station on 18 September 2019. We are deeply saddened by this tragic incident and are working closely with British Transport Police and the Office of Rail and Road as part of their investigations to understand why this terrible incident happened. No one should lose their life at work and it is critical we understand what went wrong and how we can ensure that it never happens again. Support is being provided to Mr Tuvi's family by his employer, Cleshar, and we have also offered any support necessary to his family and to those who were involved in the incident.

Tragic incident at Orpington

On 31 October 2019 our bus driver colleague, Kenneth Matcham, died as a result of injuries sustained in a major road traffic collision in Orpington. A total of 15 people were hurt, three seriously, and the buses also damaged residential property. The police arrested and charged the car driver with causing death by dangerous driving and driving under the influence of drugs. We are working with Go Ahead on the investigation into the incident in liaison with the police, and support has been offered to all victims via the Sarah Hope Line and Go Ahead's employee assistance programme.

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 increasing services as needed on existing lines and routes and are in the final phase of completing the Elizabeth line. We are also making

streets healthy, pleasant and productive places to stop at, travel through and live. Listening to, and acting on, the suggestions of our users and customers will allow 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



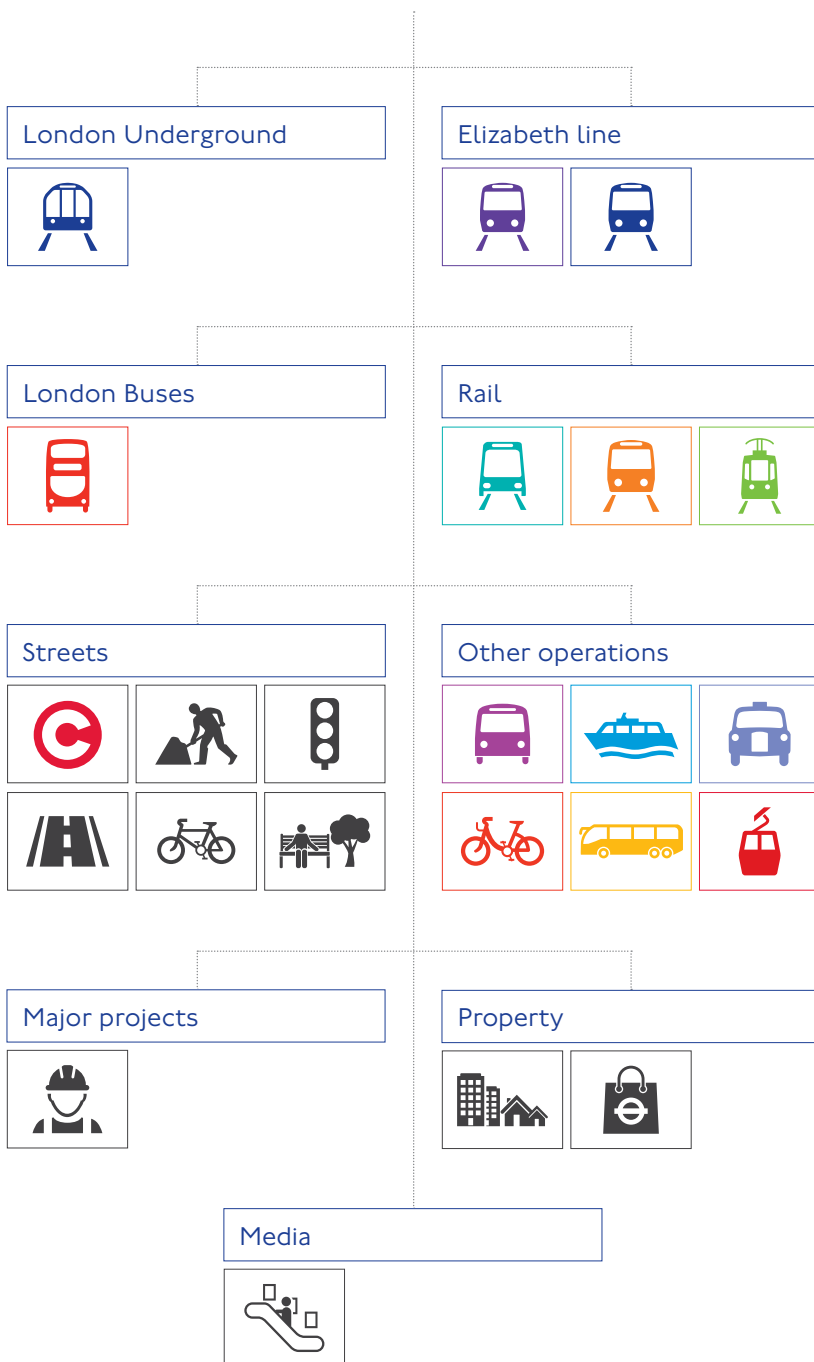


Waltham Street – cars are banned at certain times of day

Business at a glance

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

How we report on our business



Facts and figures

945 Trains on the TfL network



580km

TfL-operated highways



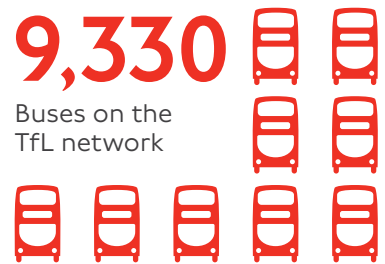
720km

TfL-operated Rail and London Underground routes



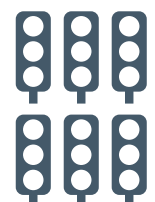
9,330

Buses on the TfL network

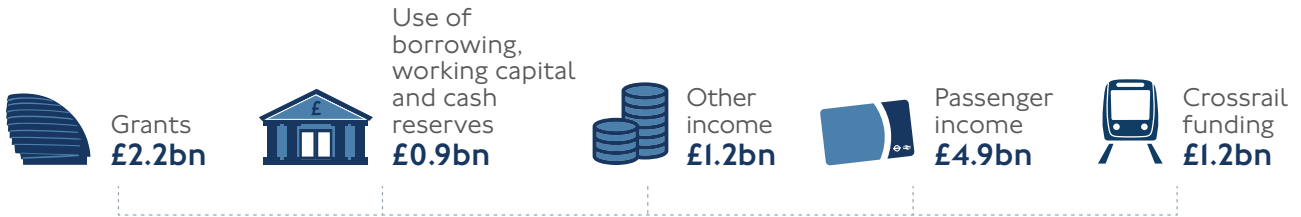


6,365

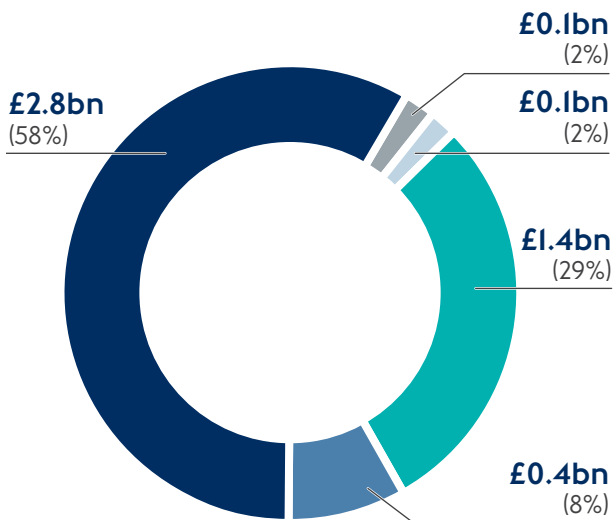
Traffic signals operated by TfL



Budget at a glance



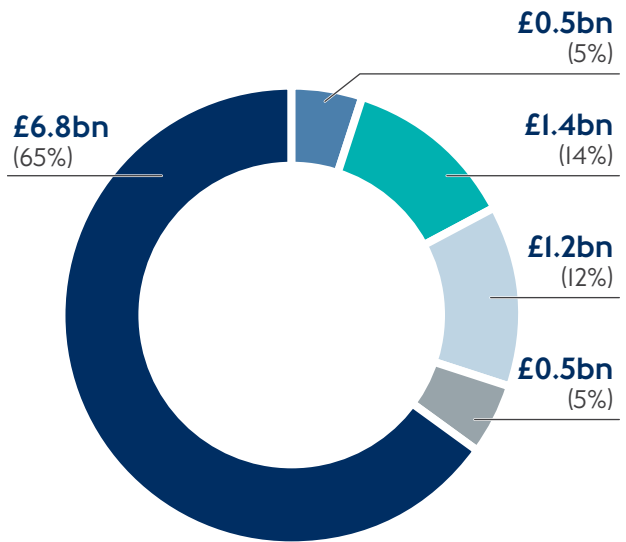
Total passenger income



Total: **£4.9bn**

- London Underground
- Buses
- Rail
- TfL Rail
- Other operations

Total costs



Total: **£10.3bn**

- Operating cost
- Capital renewals
- New capital investment
- Crossrail
- Net financing

Key achievements

Major projects

Line upgrades

Four Lines Modernisation

On the Four Lines Modernisation programme, operation of the new signalling system has been 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. All the S-stock fleet – comprising 59 eight-car trains for the Metropolitan line and 133 seven-car trains for the Circle, District, Hammersmith & City lines – has been fitted with automatic train control equipment to support communications-based train control. We are working with Thales to eliminate some of the initial software problems.

Piccadilly Line Upgrade

The CCTV contract for the Piccadilly line is out for tender and bids have now been returned. The system will allow train operators to ensure safe departure of the new train from the platform.

Network extensions

Northern Line Extension

On the Northern Line Extension at Nine Elms station, blockwork is complete and we have commenced applying the finishes.

Railway track installation is complete and all six kilometres of high voltage power cables are in place.

For the first time, the distribution network operator transformer rooms were energised at Kennington Green and Kennington Park.

Barking Riverside Extension

Since the contract award in December 2018, several key milestones have been achieved including securing planning permission for the Barking Riverside station and viaduct structure and the successful completion of a two-week long blockade of Network Rail lines to deliver essential groundworks for the viaduct. Following intensive engagement of rail industry parties, 'Network Change' approval for the scheme has now been granted by Network Rail.

Major stations

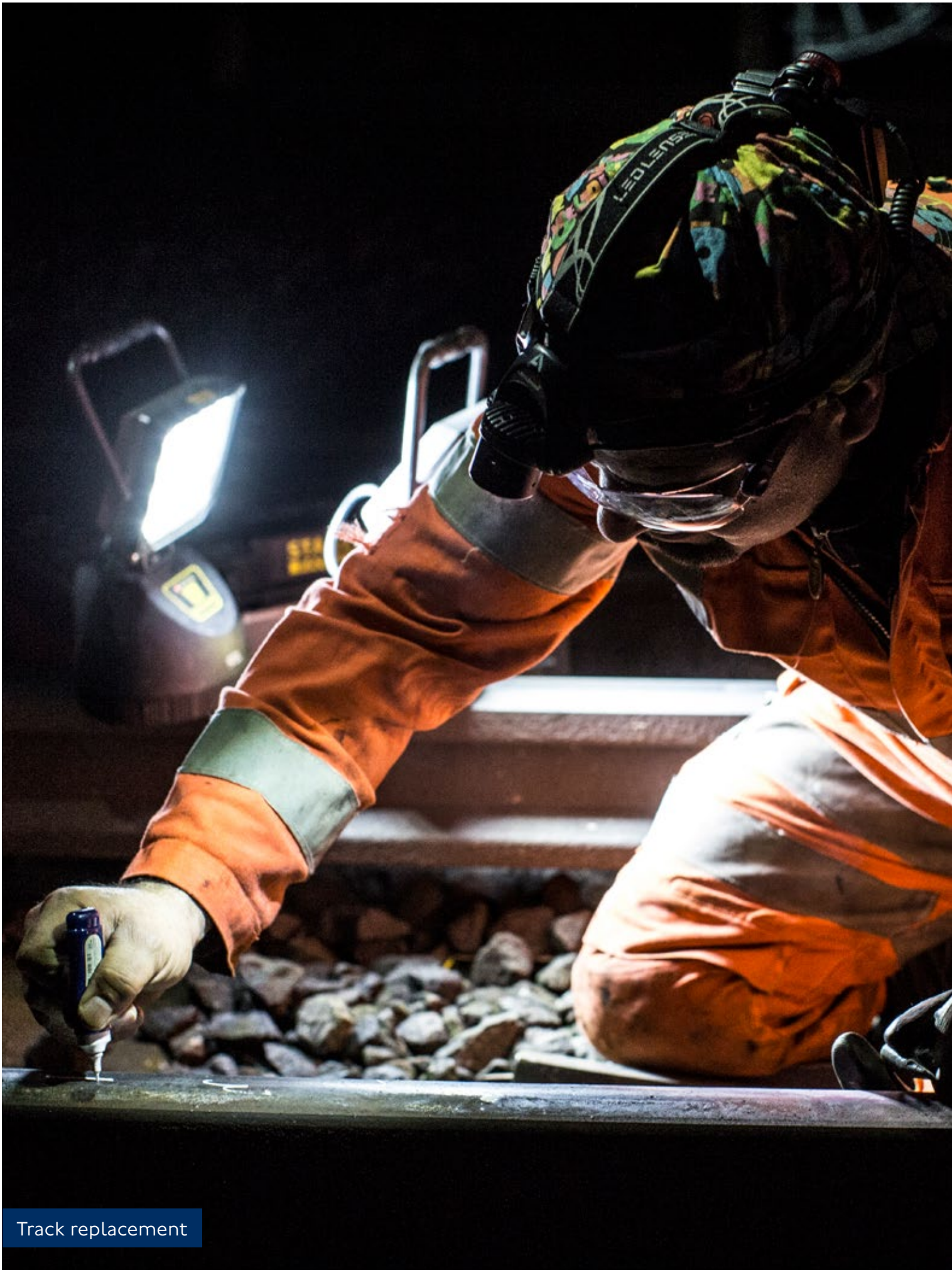
Bank Station Upgrade

A major milestone was reached this quarter with the DLR central concourse now handed over to the project, four weeks earlier than originally planned. This marks the end of two years of enabling works within the DLR area of the station to facilitate the escalator tunnel construction that will link the Northern line and the DLR via three new escalators.

The escalator barrel excavation that will form a new link to the Central line is now complete, allowing the works to connect to the existing Central line platform to commence.



Barking Riverside – proposed extension



Track replacement

London Underground

Stations

We have completed works on nine stations, (Moorgate, Liverpool Street, Charing Cross, Ealing Broadway, Holland Park, Paddington, Sloane Square, Vauxhall and Whitechapel), including three that will interchange with the Elizabeth line.

We have also completed the concept design for the South Kensington station capacity upgrade project.

Track renewals

We replaced 1.5km of ballasted track this quarter, which included the District, Hammersmith & City and Central lines. We also replaced more than 450 metres of drainage on the District line.

On our deep Tube track network, we replaced 2.4km of an older track with modern flat bottom rails and renewed a further 0.8km of concreted deep Tube track.

We have completed key milestones in this quarter including the installation of 2.5km of new track, achieved in July 2019, and installation of 1.7km of concreted deep Tube track which was achieved in September 2019.

We have also completed the installation of two points and crossings on the Piccadilly line at South Harrow.

Power, cooling and energy

We have completed the testing of new specialist equipment at Greenwich Power Station that protects the Four Lines Modernisation programme's network resilience by improving the quality of the power supply. In August we completed works at Bond Street station to provide improved airflow to the new Elizabeth line tunnel.

Signalling and control

We have finalised commissioning of all the new Piccadilly line signalling control system at the control centre in west London. All migrations are now complete.

Surface

Healthy Streets

Highbury Corner

The transformation of Highbury Corner is now complete; the road network is reconfigured and the gyratory removed, creating a new public space, segregated lanes and improved crossings. Trees are currently being planted and new hostile vehicle measures on the new public space outside Highbury & Islington station will follow later in the year once approval has been obtained from Network Rail. The Mayor visited on 2 October to officially open the scheme.

Walking and cycling

For the Cycleway between Hackney and the Isle of Dogs, detailed design for the first section of Burdett Road has been completed ahead of the start of construction currently planned for early next year.

We have constructed over 140km of high-quality cycle routes under this administration and have a further five kilometres under construction through inner and outer London. All newly completed routes will now be signed as Cycleways.

The Safer Junctions programme is on target and we have now reconstructed 31 out of 73 of the most dangerous junctions on our road network.

Air quality

On the Ultra Low Emission Zone project, the preliminary estimates indicate that after six months NOx emissions from road transport in the central zone have reduced by 31 per cent (200 tonnes) compared to a scenario where there was no ULEZ. This is ahead of schedule to meet the 45 per cent NOx emissions reduction expected in the first year.

Fleet compliance

To help meet the Mayor's air quality objectives in 2020, we are upgrading the entire bus fleet to meet Euro VI emission standards. This includes retrofitting up to 4,000 mid-life buses to meet Euro VI emission standards. We have now retrofitted over 3,400 buses and have delivered all 12 Low Emission Bus Zones around a year earlier than planned.

Asset investment

On the Ardleigh Green Bridge replacement programme, all construction works to replace the bridge have been completed and the bridge is fully open to the public.

Public transport

Works at White Hart Lane London Overground station were completed in August. This sees new station entrances with bigger, brighter and more accessible facilities which include step-free access from street to platform for the first time.

We have installed, tested and commissioned the train protection warning system for the Richmond to Gunnersbury section. Construction works were completed in the autumn.

On the DLR, high voltage works have successfully been completed at Stratford Street Market, Abbey Road exit. Once operational it will provide future resilience. We have finished a number of infrastructure projects on the North route section of railway between All Saints and Stratford, including repointing the bridge at Bow and staircase works at Bow, Devons Road and All Saints. The public address system installation is now complete and commissioned.

On London Trams, the overhaul of the hydraulic power units and brake callipers on the Bombardier CR4000 fleet of vehicles has been completed ahead of schedule and on budget.

During a successful ten-day closure of the eastern branch of the tram network in August we replaced the worn embedded rails at Chepstow Road, as well as a series of other major works to systems and infrastructure.

Tram track renewals between Addiscombe Road and Blackhorse Lane have been successfully delivered.

Other

Technology and Data

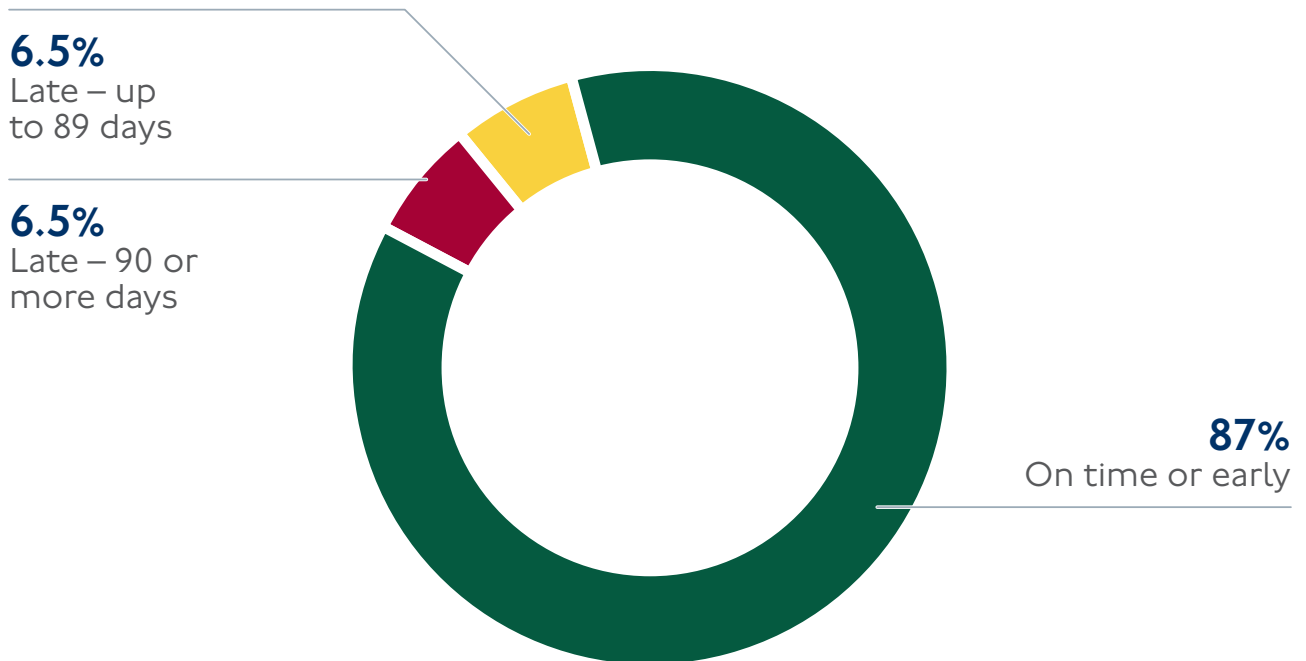
Under Technology and Data, the Future Bus Systems project has delivered the design documentation for the solution to replace our obsolete bus scheduling tools: BusNet, Caesar and SSTT. The first phase of development has been completed and early user testing has been undertaken. Development and testing activities will continue over the next 12 months. iBus2 will be replacing the current bus location and performance information systems that underpin all the bus services.

We have upgraded the back office system which calculates the fares for contactless payments. This was essential in order to cope with the increasing demand for contactless payments, which is now the single most popular way to pay for travel. It brings the contactless system into alignment with the new technology deployed ready to determine weekly capping for Oyster customers. Added benefits are that end-of-day processing of contactless payments to allow settlement with the banks happens more quickly, future fares changes are easier to implement and it reduces back office maintenance and support costs.

Following a successful prototype of a product which detects fare evasion from patterns in ticketing data, the first phase of this is being transitioned into the development area to create a final product.

2019/20 Strategic milestone performance summary

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



The late milestones are shown in the Appendix on page 96.

Major projects

Line upgrades 

Four Lines Modernisation*

Forecast completion year

2023

Spend to date (£m)

4,785

Spend authority (£m)

5,412

EFC (£m)

5,350

EFC movement post plan (£m)

(83)

2019/20 strategic milestone RAG

The first section of the new signalling system was successfully introduced earlier this year. This quarter, operation of the new signalling system has been 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. This is a significant step for the project as it continues to boost capacity.

The introduction followed extensive testing of the new signalling overnight and during planned weekend closures. This section has included the major junctions at Baker Street and Edgware Road, with the latter allowing the closure of a signal cabin that had routed trains manually for 94 years. Since then we have experienced reliability issues which have led to disruption for our customers. These have largely centred around communications issues between the software systems on and off the trains on the Hammersmith & City, Circle and Metropolitan lines. To address the reliability challenges, we have developed a plan with our signalling supplier, Thales, which includes the modification of the trains communications system as well as the line's signalling. In parallel the schedule for the software development for the remaining migration areas is under review as there

In Quarter 2, a review of the programme schedule and EFC was undertaken, focusing on assurances over key forecast assumptions and risk exposure, supported by an extensive senior management review. The outcome of this review has led to an EFC increase of £49m in the quarter and £83m in total since the 2018 Business Plan was set.

The EFC at £5,350m remains £62m under authority. The £62m reduction to date has been achieved by a previous schedule aimed at delivering the benefits ahead of the authority milestone dates, value engineering solutions, innovation, and providing the optimum scope to bring about the planned benefits.

The programme continues to periodically review scope, outturn costs, risks and opportunities in order to mitigate further increases. Initiatives are underway at a senior level to ensure pressure and scrutiny is applied to cost and time.

* This page has been updated on 11 December 2019



New Metropolitan S-stock train at Baker Street

is a concern that the suppliers schedule is unrealistic and it may not reflect the true complexity of the subsurface railway. We are working with them to arrive at a mutually agreed schedule.

While there has been a delay to the forecast date for completing the new signalling system on the Circle line, there is no impact on the planned introduction of the first timetable benefits on this line in December 2021.

The schedule for the software development for the remaining migration areas is under review as there is a concern that the suppliers schedule is unrealistic and it may not reflect the true complexity of the subsurface railway. We are working with them to arrive at a mutually agreed schedule.

Based on the current schedule, commissioning of the final signalling area between Rayners Lane and Uxbridge remains on schedule to support the final service frequency increases in 2023.

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

All the S-stock fleet – comprising 59 S8 (eight-car) trains for the Metropolitan line and 133 S7 (seven-car) trains for the Circle, District and Hammersmith & City lines – have 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. Fitting of the new signalling system to engineering vehicles is now complete. The engineering vehicles are planned to be operational under the new signalling system at the same time as the commissioning of the next signalling area.

Key milestones have been achieved at both Ealing Common and Upminster depots which have been upgraded in support of maintenance and stabling of the District line S7 trains.



Railway System Enhancements (formerly World Class Capacity)

Forecast completion year

2024

Spend to date (£m)

117

Spend authority (£m)

245

EFC (£m)

195 ▼▼

EFC movement post plan (£m)

12

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 stand-alone, a significant proportion are essential to other programmes, including 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 with Balfour Beatty.

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.

EFC has reduced by £10m since last quarter and is now £12m below 2018 Business Plan. This is primarily as a result of transferring the Stockwell HV cable scope to the Piccadilly Line Upgrade project and savings made through depot activities.



DLR Rolling Stock and Systems Integration

Forecast completion year

2025

Spend to date (£m)

23

Spend authority (£m)

603

EFC (£m)

603

EFC movement post plan (£m)

30

2019/20 strategic milestone RAG

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

The programme will replace 60 per cent of the existing DLR fleet that is nearing the end of its design life and provide additional trains, which will increase 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.

Beckton depot enabling works have commenced on site. The first sidings package is out to tender. The signalling contract with Thales has been signed.

Following a well-planned competitive procurement exercise, the contract for the supply of DLR trains was awarded to Construcciones y Auxiliar de Ferrocarriles in June 2019. Driving down cost and gaining more certainty around the contract has led to an EFC reduction of £30m against 2018 Business Plan.



Piccadilly Line Upgrade – rolling stock and enabling (formerly Deep Tube Upgrade Programme)

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2030/31	135	3,294

2019/20 strategic milestone RAG

The Piccadilly Line Upgrade 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 achieved the milestone to complete the concept design for the new Piccadilly line trains and to present a first-look walkthrough of the air cooled trains over two months ahead of target at the beginning of November. The concept design report was made up of over 50 individual design submissions. We are already starting to progress to the next (preliminary) stage of design. This concept stage is carried out to ensure requirements have been fully understood. The successful completion of the concept design allows later design stages to be finalised before beginning the manufacture and testing stages.

The CCTV contract for the Piccadilly line is out for tender and bids have now been returned. The system will allow train operators to ensure safe departure of the new train from the platform. Award of the CCTV system contract is planned for Quarter 4 of 2019/20 (previously Quarter 3). This is to account for the extra time afforded to the tenderers for a scope addition and the need for increased time to evaluate the offers as more viable bids were returned than originally planned for.

EFC (£m)	EFC movement post plan (£m)
2,965 ▼▼	144

The EFC and spend authority relates only to works and enabling associated with the Piccadilly line trains introduction programme. Work continues to support the case to gain funding for new signalling on the Piccadilly line, which forms part of a wider programme EFC.

A contract was signed in 2018 with Siemens to design and build 94 Tube trains to replace the existing 1970s fleet. As the programme progresses, the train design has matured and a decision has been taken to reduce the uncertainty in cost provision on rolling stock accordingly by £70m. Further to this, a change of approach in the delivery model has also led to a saving of £58m. The remainder of the reduction in the quarter is as a result of changes in the risk profile held against individual projects.

Network extensions



Northern Line Extension

Forecast completion year

2021

Spend to date (£m)

822

Spend authority (£m)

1,260

EFC (£m)

1,147

EFC movement post plan (£m)

33

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 across all NLE work sites.

Primary civils and structural work is complete across the NLE and fit-out of the stations and head houses is the focus to get the NLE available for revenue service in autumn 2021.

At Battersea station, blockwork is nearing completion and we have commenced applying the finishes. The first escalator truss has arrived on site and been lowered into position. Fit-out of the transformer and signalling rooms nears completion. The first tunnel vent fan was delivered to site and lowered into the fan room beneath the western ramp.

The EFC is £113m under authority and £33m under the 2018 Business Plan. The EFC is supported by a revised forecast profile developed as part of the execution of the supplementary agreement in June 2019 with the primary main works contractor Flo. Associated with this agreement is the reassessment of risk to reflect the anticipated benefit from the execution of the supplemental agreement and programme improvement. Additionally EFC includes efficiencies relating to the Railway System packages following contract award and savings delivered from waterproofing at Battersea, revised craneage strategy and delivery and installation of rail.



Southbound tunnel of the Northern Line Extension

At Nine Elms station, blockwork is complete and we have commenced applying the finishes. Escalator trusses were delivered to site and temporary works have been completed for the first truss to be moved into position. The architectural metal-pipe ceiling in the escalator atrium is nearly complete and work continues on the erection of the acoustic panelling in the ticket hall. Fit-out of the transformer and signalling rooms nears completion.

Railway track installation is complete and all six kilometres of high voltage power cables are in place. Work has commenced on wayside signalling installation.

For the first time, the electricity supplies to the transformer rooms were energised at Kennington Green and Kennington Park.

NLE has been shortlisted in the New Civil Engineer's Tunnelling Awards under two categories:

- Innovation in Design and Delivery for the Kennington Station cross-passage works
- Innovation in Tunnel Lining for the secondary lining travelling shutter formwork, with Tecozam

The results will be announced at the awards ceremony in December.



Silvertown Tunnel

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2025	57	*	*	*

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 wider east and southeast London area.

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 the problem of 'standstill' traffic to deliver an overall improvement in air quality. It will also provide several new cross-river bus routes in east London which are expected to be zero-emission from launch.

The project will be procured through a Design, Build, Finance and Maintain contract.

Following a competitive procurement process, the Riverlinx consortium was awarded a design, build, finance and maintain contract at the end of November for the construction and maintenance of the tunnel. We will start making payments once the tunnel

is open and available for use. We will be able to reduce payments should the tunnel not meet certain key standards, such as availability for use by traffic and physical condition.

Pre-build activities to facilitate a smooth start to construction, once the contract is awarded, have continued. Design for the replacement of North Greenwich car parks is complete and work is ongoing with utility companies to agree how to progress early service diversions. Monitoring of both existing structures and noise continue ahead of the start of construction. Discussions are ongoing with third parties to put in place the relevant agreements including negotiating land access.

* This information is withheld for reasons of commercial sensitivity.



Barking Riverside Extension

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2022	82	287

2019/20 strategic milestone RAG On Track

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. Train services are planned to start in 2021.

Since contract award in December 2018, several key milestones have been achieved including securing planning permission for the new Barking Riverside station and viaduct structure and the successful completion of a two-week long blockade of Network Rail lines to deliver essential groundworks for the viaduct. Following intensive engagement of rail industry parties, 'Network Change' approval for the scheme has now been granted by Network Rail.

Piling for Barking Riverside station has been completed, construction of the pier walls and lift shaft are well advanced and installation of decking has now commenced. The upgrade of the existing line from Barking station has also made good progress despite some challenging ground conditions hampering piling for the new overhead line equipment structures.

EFC (£m)	EFC movement post plan (£m)
285	1

The main works contract was awarded in December 2018 and the EFC remains in line with the approved programme and project authority. As detailed below, the discovery of uncharted utilities continues to pose a significant risk to the programme. Issues arising as a result are putting the EFC under pressure and this will remain under close review.

Discovery of uncharted utilities within the viaduct ramp area and at viaduct pier locations across the site continues to represent the major risk to programme. There has been progress in reducing both the number and impact of issues presented by these utilities, including instructing the redesign of pier foundations to mitigate the impact of diversion timescales on the critical path. However, significant utilities challenges remain and further mitigations are required, meaning the planned opening date of December 2021 continues to be under pressure (a report on this matter is due to be considered at the Programmes and Investment Committee on 18 December 2019).

Major stations

Victoria station upgrade and finishes

Forecast completion year

2019

Spend to date (£m)

580

Spend authority (£m)

604

EFC (£m)

585

EFC movement post plan (£m)

(4)

2019/20 strategic milestone RAG

We have opened a new north ticket hall and 300 metres of subways, and have increased the size of the south ticket hall by 50 per cent. Step-free access to all platforms is now in place. The station is used by 83 million people each year.

The project is complete other than some minor works to be closed out. It should be noted, however, that other works are taking place at Victoria station, escalator refurbishment among others, but these are unconnected with the Victoria Station Upgrade project.

The Terminus Place reinstatement works are also now complete and we expect to reopen the road in the next quarter.

The EFC has increased by £1m since last quarter and £4m since the 2018 Business Plan to reflect the prolongation of the programme to complete works and final account settlements. The EFC remains £20m below authority. The project is on course to complete works on site and to close the project in December 2019.



Bank station upgrade

Forecast completion year

2022

Spend to date (£m)

458

Spend authority (£m)

656

EFC (£m)

664

EFC movement post plan (£m)

(8)

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 to reduce customer journey times.

A major milestone was reached this quarter with the DLR central concourse now handed over to the project. This marks the end of two years of enabling works within the DLR area of the station to facilitate the escalator tunnel construction that will link the Northern line and the DLR via three new escalators.

The escalator barrel excavation that will form a new link to the Central line is now complete, allowing the works to connect to the existing Central line platform to commence.

The construction of the new station entrance on Cannon Street continues with the interior wall construction and station fit-out commenced. The cross-passages to the new Northern line tunnel are underway and will enable the new southbound running tunnel and platform to be connected to the existing Northern line in 2021.

The EFC remains static in the quarter. The EFC is £8m higher than the 2018 Business Plan due to a changed risk profile and additional external scope items required to deliver the upgrade. Risk mitigation reviews are continuing to be held each period along with opportunities to reduce the current EFC. We continue to work collaboratively with the main contractor to identify and realise potential savings with a view to reducing the EFC back to the 2018 Business Plan position.



High-speed train at St Pancras International



HS2

Forecast completion year	Spend to date (£m)	Spend authority (£m)
*	7	11

2019/20 strategic milestone RAG



EFC (£m)	EFC movement post plan (£m)
46	1

This project is fully refundable by a third party client and the scope of works is dependent on the third party client's instructed requirements. Since the Business Plan and Quarter I EFC were set, there have been client-instructed changes to the scope of works which are reflected in the current EFC.

Our interface with the new high-speed railway connecting London to the West Midlands and the north of England comprises new TfL assets, infrastructure and operational facilities at Euston and Old Oak Common.

We continue to work with HS2 Ltd to deliver the agreed protection of our assets and design assurance work required for the HS2 programme. This includes design reviews for the work that HS2 Ltd will undertake at Euston and the interfaces with the London Underground stations at Euston and Euston Square.

The government announced a major review in August of whether and how to proceed with HS2 due to cost and schedule pressures. The panel was given a brief to look at options such as reducing speeds and making Old Oak Common the London Terminus, (at least for a period). In September we met with the HS2 review panel, alongside the Deputy Mayor for Planning, Regeneration and Skills to highlight the key issues for London, and the stations required at both Old Oak Common and Euston to maximise passenger benefits, ensure effective capacity relief and support growth in jobs and homes in these areas. The views expressed were confirmed in a letter from the Mayor on 3 October 2019. The review is expected to report its findings in the autumn of 2019.

* The forecast completion date is to be confirmed following the outcome of the Oakervee report and an enhanced baseline review



Bakerloo line, Willesden Junction

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.

Crossrail 2

Following the submission of the Strategic Outline Business Case (SOBC) to Government in June 2019, a Crossrail 2 Project Assurance Review (PAR) took place in September on behalf of the Cabinet Office and HM Treasury. The Review findings will be shared with the Department for Transport's Board Investment & Commercial Committee, TfL Programmes and Investment Committee and HM Treasury so they can be assured of the quality and robustness of the SOBC. Government will take on board PAR's advice when making a decision on the best way to take the project forward.

Work continues to ensure Crossrail 2's assurance processes are fit for purpose. In support of the work of the Independent Assurance Panel, which is being led by David Orr, a number of expert review groups have been convened to test, challenge and scrutinise the work of the team with a particular focus, at present, on the Cost and Risk, Tunnelling and Digital workstreams.

Bakerloo Line Extension

We have continued to develop our plans to deliver an extension and upgrade to 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 more 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 GLA and the London Boroughs of Southwark and Lewisham, to make sure we can deliver the best possible scheme and to prepare for the next round of public consultation, which launched on 14 October. The consultation is seeking views on new features of the extension proposals, 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 the Old Kent Road. 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.

London Underground

Stations 

Forecast completion year	Spend to date (£m)	Spend authority (£m)
2023/24	2,055	3,230

2019/20 strategic milestone RAG

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

Integrated stations programme

We have completed works on nine stations, (Moorgate, Liverpool Street, Charing Cross, Ealing Broadway, Holland Park, Paddington, Sloane Square, Vauxhall and Whitechapel), including three that will interchange with the Elizabeth line. This programme of work is now complete and is in the final stages of being formally closed.

Station enhancements

At Finsbury Park, work on the new western station entrance continues and we plan to open this in late 2019.

We have completed the concept design for the South Kensington station capacity upgrade project and we are working on the next stage in anticipation of commencing detailed design.

We will provide step-free access at Knightsbridge and build two new entrances on Brompton Road and Hooper's Court in partnership with a developer, who will enable and part-fund the works. The civil engineering works on the lift shaft to the platform were completed in June.

EFC (£m)	EFC movement post plan (£m)
2,379 ▼▼	0

The EFC, which covers all projects including those completed within the stations programme, has increased from £2,553m at Quarter 4 as a result of increased costs on developer-led projects including Crossrail and Stratford.



Moorgate station

We continue the redevelopment and upgrade of Tottenham Hale station. The new station structure is in construction.

Concept design and the construction support study for Colindale station is now complete and detailed design due to commence in early 2020. Full planning consent for the new entrance, along with outline consent for the adjacent residential developments, was granted in July 2019. The project will bring significant improvements, including a spacious new entrance, a new lift providing step-free access to the platforms and new homes around the station.

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 working with the developer to finalise agreements.

We have completed the new South Bank station entrance at Waterloo with three new escalators (including one to replace the previous fixed staircase) and associated back-of-house systems and accommodation facilities are now all in service. The entrance was formally opened in May 2019.

We are creating 11 retail units in the railway arches beneath Wood Lane station, where we continue to progress installation of core services.

In July, the London Borough of Southwark recommended planning permission be granted for a new town centre at Elephant & Castle, subject to agreement and approval by the GLA and the Secretary of State. We continue to await final approval on the Section 106 agreement with the developer and the London Borough of Southwark. As part of the development, a new station box with connecting tunnels to the existing platforms will be built to increase capacity at the station and provide step-free access to the Northern line.

At Paddington, we are working with Great Western Developments to enable them 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 their redevelopment of adjacent buildings. We successfully completed negotiations with Great Western Developments and their consultants, which has led to the signing of the Land and Works agreement. This in turn now means we can progress the project and anticipate starting on site in February 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.

Accessibility



Forecast completion year

2023/24

Spend to date (£m)

56

Spend authority (£m)

244

EFC (£m)

156 ▲

EFC movement post plan (£m)

20

2019/20 strategic milestone RAG



We are working on a wide programme of accessibility improvements, customer service and information enhancements across the Underground network. We will make over one-third of stations accessible by 2020 by providing step-free access at a further 15 stations.

Fifteen stations will become step-free by spring 2020 as part of the Mayor's funding for step-free access. We delivered step-free access at three stations in 2018/19.

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

We have started the installation of the first new lift at Mill Hill East, making good progress with piling, lift pit construction and steelwork installation at some sites such as Cockfosters. Challenges remain at other sites, with buried services, such as power cables and drainage channels that were not identified on the station plans or during the surveys causing delay to piling.

The EFC has decreased from £165m at Quarter I in line with the 2018 Business Plan but still represents unprecedented investment in Tube accessibility. The EFC has changed as the programme matures and site conditions and restrictions are better understood.

Track renewals

Forecast completion year

Annual

Spend to date (£m)

59

Spend authority (£m)

122

EFC (£m)

130 ▼

EFC movement post plan (£m)

(8)

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 1.5km of ballasted track in the second quarter of the 2019/20 programme, which included the District, Hammersmith & City and Central lines. We also replaced more than 450 metres of drainage on the District line.

On our deep Tube track network, we replaced 2.4km of an older track with modern flat bottom rails and renewed a further 0.8km of concreted deep Tube track.

The Track Renewals programme has completed key milestones in this quarter which includes the installation of 2.5km of new track, achieved in July 2019, and installation of 1.7km of concreted deep Tube track which was achieved in September 2019.

Furthermore, during Q2 the Track programme has completed the installation of two points and crossings on the Piccadilly line at South Harrow.

The EFC has increased by £8m since budget was set to reflect the current delivery programme for 2019/20. The forecast now includes additional scope and acceleration of works approved by the programme board. It also includes scope for the additional instructions issued by the Sponsor since the budget was set.

Power, cooling and energy



Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24*	48	90	88 ▼▼	0

2019/20 strategic milestone RAG

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 the delivery of a number of third-party and major projects by providing power works, such as relocating the substation at Euston for High Speed 2, installing cable routes for the Northern Line Extension and works for the Piccadilly Line Upgrade, and the Bank Station Capacity Upgrade.

We are delivering a rolling portfolio of power renewal works to improve asset condition 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, and designs for the next priorities completed and 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, which will be commissioned into service before 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 system. The system, once completed, will remotely monitor and safely operate traction, station, signalling and depot power supplies on all lines.

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

Cooling

In August 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 installing 1.1 megawatts of solar power at three depots and are also assessing other sites across our estate for suitability of solar either on rooftops or on land. The project team is assessing the feasibility of installation at alternative sites to meet the Mayor's solar energy commitment.

Rolling stock renewals

Forecast completion year

2023/24

Spend to date (£m)

195

Spend authority (£m)

525*

EFC (£m)

968▼

EFC movement post plan (£m)

15

2019/20 strategic milestone RAG 

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

The Quarter 1 EFC reported figure of £983m has reduced by £15m to £968m in Quarter 2, mainly due to reduction of risk in other programmes and some programmes have been removed from the calculation as they are closed.

On the Jubilee Line, we have been running a reduced frequency service due to mechanical issues found on the trains.

We have refurbished 58 out of 63 Jubilee line trains. The refurbishments include a wheelchair area, new flooring, refreshed interior (including grab-poles and handles), and new sealing to the roof and windows. We have now started to install the new priority seating moquette.

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 are refitting the vinyl of the first eight trains to make them consistent with later trains, and this will complete in December 2019.

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

On the Central line improvement programme, four carriages are being prototyped at the supplier's site. The new Train Management System has started dynamic testing on a second prototype train on London Underground premises. We continue to work with our supply chain on the enabling of the installation facilities for the improvement programme on the full fleet.

The construction of a new facility to support the Train Modification Unit based at Acton has progressed on site. Foundations, foundation slabs and structural steel are all complete. The roof and exterior cladding has begun, and we have started work on the track layout.

The manufacturing of the first seven pre-production wagons (engineering vehicles) in China is nearing completion. They will undergo static testing in China before being shipped to the UK. Four of these wagons will undergo dynamic testing in the UK during spring 2020 and three wagons will be delivered to Ruislip. Once the pre-production wagons have been fully tested and approved, the manufacture of the remaining 66 wagons is expected to commence in summer 2020.

The Mechanised Renewals Vehicle will improve the way track is renewed in the deep Tube sections (Bakerloo, Central, Victoria, Jubilee, Northern and Piccadilly lines) of the London Underground

network. We are working to develop a cost-effective solution to deliver cost and safety benefits to the track programme next year.

The two Kirow cranes and eight tilting wagons being procured to facilitate mechanisation of points and crossing renewals have undergone final testing in Germany, and are currently being prepared for transport to the UK via rail later this year.

To ensure the infrastructure is ready to receive the engineering vehicles, Ruislip depot is undergoing infrastructure upgrades to facilitate stabling and loading of these vehicles.

Following an option selection evaluation exercise, we have started the tender phase for replacing our track recording vehicle, which records and monitors the alignment and condition of the track, supporting track maintenance and renewal activities.

The project to provide train operators enhanced control over unauthorised entry into the cab from the saloon is progressing well – contract award is due shortly and installation support is being finalised.

Signalling and control

Forecast completion year

2023/24

Spend to date (£m)

79

Spend authority (£m)

145

EFC (£m)

180 ▲

EFC movement post plan (£m)

0

2019/20 strategic milestone RAG 

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.

The EFC has been updated to £180m in line with the latest Programmes and Investment Committee paper, excluding future projects beyond the next five years.

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.

We have finalised commissioning of all the new Piccadilly line signalling control system at the control centre in west London. The migration of control has progressed well and all migrations are now complete. This project is now in the process of closing down.

Works to enable the replacement of the signalling system in Northumberland Park depot on the Victoria line has commenced; this is required to interface with the new depot control system. A contract award has been awarded for the design phase.



Train Assign

TTID	Line	Mode	Status
T044		RM	VCC Cont...
T040		PM	Idle
042-005	Lp HBT	Auto	Not depa...
055-006	Lp HBT	PM	Moving
057-003		OFF	VCC Cont...
057-004	Lp HBT	OFF	Held - Cr...
063-008	Lp HBT	Auto	Moving
T004		NCT	Idle

Run	Trip	Train
057	9	
057	11	
060	3	
060	5	
060	7	
060	9	
060	11	
060	13	
060	15	
061	1	
061	3	
061	5	
061	7	
061	9	

Assign at Location: WFY1
 Trip/Time: 005 (13:51:00)
 Immediate
 Pair Renumbering

WFY2 - Prediction List

TTID	Dest	Variance	Serv. Status	Location
055-006	MORS-Y	11:04	In Service	Bt HBT and TOT SB
				At HBT2 SB
				At WDP1 NB
				Bt TOT and HBT NB
				WFY PLAT NB
				Bt EFN and FNC NB
				FNC PLAT NB
				App HGA NB

Northern line signalling centre, Highgate

Surface

Healthy Streets

Forecast completion year

2021/22

Spend to date (£m)

507

Spend authority (£m)

1,207

EFC (£m)

1,473 ▼▼

EFC movement post plan (£m)

134

2019/20 strategic milestone RAG

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

The main highway and urban realm work is now complete; the road network is reconfigured and the gyratory at Highbury Corner removed. Planting of new trees and installation of new hostile vehicle measures within the urban realm area and outside Highbury & Islington station will follow later in the year once approval has been obtained from Network Rail. The Mayor visited on 2 October to officially open the scheme.

The scheme is expected to be fully complete by the end of 2019.

Wandsworth Gyratory

The purchase of properties from landowners on Putney Bridge Road is progressing, with the acquisition of the remaining three properties expected to complete in November 2019. The revised scheme layout in Armoury Way has been completed with the design refinements requested

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 currently reviewing options to deliver a ferry crossing. This accounts for the majority of the reduction in EFC compared to the previous quarterly report.



Walking & Cycling Commissioner Will Norman launches the Quietway campaign in Hackney

by the London Borough of Wandsworth. Agreement for the amended layout has passed committee and was approved subject to public engagement by the Executive at its meeting on 7 October. Detailed design remains on track to run in parallel with the Compulsory Purchase Order process. We plan to start construction at the end of 2021.

Fiveways

The project aims to alleviate congestion and smooth traffic flows 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. Preparations have been made for a planning application to be submitted and a tender for a design and build contract to be let, both during 2020.

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 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, with Phase I construction planned for December 2019.

Safety improvements for the Duke's Road and Churchway junction on Euston Road will be the first phase. 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

This scheme provides a significant upgrade for the safety and comfort of pedestrians, cyclists and public transport users. The scheme will provide a new pedestrian walking route to the river, improved crossings, segregated cycling facilities and improved bus waiting and boarding areas. The proposed transformational scheme is currently in detailed design. 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 bring safety improvements to 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 the 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 to Cowper Street. Utility diversions by Thames Water, UKPN and Cadent Gas have been completed in the area and excavation is underway for this new entrance which will be completed in spring 2020.

Within the peninsula area, site clearance works have commenced as well as installation of a temporary goods lift for the shopping arcade area. This allows removal of the existing goods lift in readiness for demolition works for the new main entrance which starts later this year. Early next year, a further traffic switch will take place to reopen the southeast arm of the roundabout and permanently close the northwest

arm, facilitating the construction of the public space, new passenger lift and new main station entrance in the peninsula area. Planning consent for the new main station entrance was obtained from Islington Council in September 2019.

Lambeth Bridge North and South

This scheme provides a significant upgrade for the safety and comfort of 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. We continue to detail the scope of the work required to replace the waterproofing, drainage and expansion joints on the bridge deck. The design of the permanent protective security measures (PSM) on the bridge is progressing well. We have secured endorsement from the PSM Oversight Group on the PSM design principles. This reflects conversations which we have had with heritage officers, whose agreement is needed to make changes to this listed bridge. We continue to work with Westminster City Council to identify a design for the northern roundabout which responds to concerns raised during the 2017 consultation.



Cycleway 9 plans for Kew Bridge

Cycling improvements between Wood Lane and Acton

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 and have commenced between Leamington Park and Horn Lane. Upgrades to the existing shared-use facility between Wood Lane and Sundew Avenue are now complete, and work has commenced between Sundew Avenue and Banstead Court.

Proposed cycling improvements between Wood Lane and Notting Hill Gate

We are continuing to review our proposals for improvements between Wood Lane and Notting Hill Gate, considering feedback from the consultation which closed on 16 June. We published the consultation report on 5 November and are now awaiting feedback on our revised proposals from Kensington and Chelsea and Hammersmith & Fulham councils.

Cycleway 4

Construction started for Cycleway 4 on 5 July 2019 and is making good progress along the A200 Jamaica Road, Rotherhithe roundabout and Tooley Street, with the works anticipated to

complete by May 2020. The Mayor visited the construction on the 27 August and announced that we will introduce five new Santander Cycles docking stations along the route between Tower Bridge and Canada Water. We are also planning the construction phases for the Lewisham and Greenwich sections of the project. The Greenwich section is currently planned to start at the end of November 2019. Consultation for the Lower Road section of the route led by Southwark Council completed on 4 October, and includes their proposals to make some roads in the area two-way.

Cycleway 9

Following the completion of re-consultation of two elements of the scheme in February, the 'Response to Issues Raised' report was published in July 2019. Detailed design for the Kew Bridge section was completed in early September with road safety audits currently being undertaken. London Borough of Hounslow's Cabinet approved the scheme within Hounslow on 3 September 2019. The London Borough of Hammersmith & Fulham is due to go to Cabinet in December 2019 for a decision to construct its section. Subject to the remaining stages of the decision-making process, construction work is scheduled to commence 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, with results published on 3 October. Detailed design for the first section of Burdett Road has been completed ahead of the start of construction currently planned for early next year. Planning permission has been secured for a relocated cycle hire station, and arrangements made for advanced utility works and relocation of assets including bus shelters. We are continuing to work closely with Tower Hamlets Council to coordinate the Grove Road proposals with their proposed Liveable Neighbourhood scheme in the same area.

The northern section of the route is being delivered by the London Borough of Hackney and it is progressing with detailed design with the aim to start construction in early 2020.

The Isle of Dogs section has now been de-scoped from the main project as traffic and cycle flows are too low to justify a fully segregated layout. Improvements in the Isle of Dogs will be progressed as part of the Cycleway Network development with 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 first section of the Cycleway between Lea Bridge and Dalston, which was followed by the second section in early November. We also plan to consult the public on a Cycleway between Greenwich and Woolwich before Christmas or early next year.

Cycleway between Camden and Tottenham Hale

We have begun full remodelling of the scheme following a design review of the route which would run between Camden and Tottenham Hale. This review has enabled us to further refine the proposals and to engage with key stakeholders including the relevant local boroughs. These activities have aimed to ensure the scheme that goes out 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

We continue to make good progress on the Mini-Hollands, and the development of the wider Cycleway Network, with a focus on completing and opening whole or significant sections of these routes. We have constructed over 140km of cycle routes and have a further five kilometres under construction through inner and outer London. All newly completed routes will now be signed as Cycleways.

The Mini-Hollands programme involves 98 infrastructure schemes and five behaviour change schemes across three outer London boroughs – Waltham Forest, Enfield and Kingston. Thirty-two of the 103 Mini-Holland schemes are now complete, including the A105 Green Lanes scheme, a five-kilometre protected cycle route linking Enfield Town to Palmers Green and the Kingston Station Plaza, which sees improved accessibility for both pedestrians and cyclists. Schemes currently under construction include protected cycle routes on Wheatfield Way in Kingston, on the A1010 in Enfield, and on Lea Bridge Road in Waltham Forest. Further schemes are progressing through design and consultation, including a number of cycle links and Enfield's Quieter Neighbourhoods.

The Deputy Mayor for Transport, Heidi Alexander, opened new public spaces, crossings and cycle routes as part of Waltham Forest's award-winning Enjoy Waltham Forest scheme on 17 October. The Enjoy Waltham Forest programme is nearing completion with cycling routes along Markhouse Road and Temple Mills Lane, a transformation of the Blackhorse Junction, and new cycle parking at Blackhorse Road station to be completed next year along with the Coppermill Area Liveable Neighbourhood scheme.

Rotherhithe to Canary Wharf Crossing

Following the decision of the Programmes and Investment Committee on 21 June that the crossing should revert to feasibility, we have been examining options for a new ferry service, with work focused on route planning, fares, vessels, piers and connectivity to the local area. It is envisaged the feasibility work will continue through to October, at which time a report will be prepared for the Programmes and Investment Committee setting out the recommended way forward. The work on a new ferry to improve connectivity for pedestrians and cyclists between Rotherhithe and Canary Wharf is alongside the wider investment we are making in walking and cycling across the area, including delivery of Cycleway 4 and new cycle routes from Rotherhithe to Peckham and Hackney to the Isle of Dogs.

Safer Junctions

In April 2017, the Safer Junctions list highlighted the 73 most dangerous junctions on our road network (defined as those with the highest vulnerable road user collision rates between 2013 and 2015). Following completion of Highbury Corner in September, we have now constructed 31 of these junctions and all of them have had mitigation measures introduced to reduce road danger. Construction of Camberwell Town Centre Safer Junction began in October, and work continues on the Rotherhithe Tunnel junction as part of Cycleway 4. The programme is currently on target to complete 41 junctions by May 2020, in line with the Mayor's Vision Zero commitment – although there are challenges to be overcome in relation to concerns raised by stakeholders during recent consultations.

Public consultation reports have been completed on the following Safer Junction 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

Lowering speed limits

The consultation report for introducing 20mph in central London has now been published, and detailed design is well advanced. The Traffic Regulation Orders have also been published for consultation, which are needed to ensure the new speed limit is legally enforceable. The construction schedule is under development, with the aim of completing the bulk of works by February 2020; this will enable behaviour change marketing communications to take place ahead of the scheme launch.

Direct Vision Standard (DVS)

The 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 proposed Heavy Goods Vehicle (HGV) Safety Permit Scheme was launched by the Mayor on 29 October and will require all HGVs weighing more than 12 tonnes to obtain a permit to operate in London and all those with an unacceptably low DVS rating to fit additional safety equipment.



Healthy Streets, Kingsland Road



Liveable Neighbourhoods, Waltham Forest

In April 2019 we published the findings of a consultation on the proposals. This showed 60 per cent support and feedback has been used to make further refinements to our proposals. On the same day the consultation on the finalised scheme proposals was launched, including on a Traffic Regulation Order to make the scheme mandatory from October 2020. This additional consultation closed on 23 May 2019. Four non-qualifying objections were raised but no public inquiry was required. London Councils have signed the Traffic Order and the Notice of Making was published on 27 August 2019. Permits for HGVs were launched on 28 October 2019, with scheme enforcement commencing 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 create capacity for additional footfall and help regenerate local communities. So far, Crossrail complementary measures works are complete at five stations (Abbey

Wood, Chadwell Heath, Goodmayes, Manor Park and Romford). Site works at 10 stations (Forest Gate, Gidea Park, Hanwell, Harold Wood, Ilford, Maryland, Seven Kings, Acton Main Line, West Ealing and West Drayton) are at various stages of construction. Two stations (Southall and West Ealing) 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 – and some of the west London stations will be completed later than December 2019, as a result.

Liveable Neighbourhoods

Liveable Neighbourhoods is a key part of the Mayor's Transport Strategy, which aims to create locally-led, attractive, healthy and safe neighbourhoods that encourage walking, cycling and public transport use and reduce car journeys. In 2018/19, feasibility funding was awarded for the first phase of the programme.

Eighteen projects are now in progress across 18 boroughs:

- West Ealing, London Borough of Ealing
- Greenwich Town Centre, Royal Borough of Greenwich
- Hackney Central, London Borough of Hackney
- Crouch End, London Borough of Haringey
- Romford Town Centre, London Borough of Havering
- Deptford Parks, London Borough of Lewisham
- Coppermill Village, London Borough of Waltham Forest
- Shortlands, London Borough of Bromley
- Holborn, London Borough of Camden
- Old Town, London Borough of Croydon
- Enfield Town, London Borough of Enfield
- South Chiswick, London Borough of Hounslow
- Brixton, London Borough of Lambeth
- Custom House, London Borough of Newham
- Bramcote Park, London Borough of Southwark
- Bow, London Borough of Tower Hamlets
- Ilford, London Borough of Redbridge
- City Cluster, City of London

Early works commenced on the Coppermill Village project and public consultation was launched for phase one of the West Ealing project. In addition, Croydon Old Town, Enfield Town, South Chiswick, Brixton, Custom House and Bow began their feasibility phase. In July 2019, the inaugural Liveable Neighbourhoods conference took place in Alexandra Palace.

Borough Local Implementation Plan projects

Blackhorse Road/Forest Road

The London Borough of Waltham Forest commenced construction in June and are expected to be on-site for 12 months. The works are on-programme and the contractor is now undertaking the improvements outside the Underground station.

West End Project

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). Works are currently on-site at Gower St/Princess Circus and scheduled to finish by summer 2020.

Feltham Town Centre

The London Borough of Hounslow (High Street improvements) and Network Rail (station) works are well underway. All phases and elements of the scheme will be completed and allocation fully spent by November 2019.

Air quality



Forecast completion year

2022/23

Spend to date (£m)

173

Spend authority (£m)

280

EFC (£m)

508▲

EFC movement post plan (£m)

(37)

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

In April 2019 we successfully introduced the new Ultra Low Emission Zone (ULEZ) in central London. It enforces the world's toughest vehicle emission standard and the first to operate 24/7. The ULEZ has replaced the T-Charge and operates in the same area of central London as the Congestion Charge. The initial running of the scheme has gone well, with customer call centre volumes very high on the day of launch but much reduced thereafter.

In the first six months of the scheme, up to September 2019, there was a large reduction in the number of older, more polluting, non-compliant vehicles detected in the zone: some 13,500 fewer on an average day, a reduction of 38 per cent in Congestion Charging hours.

Preliminary estimates indicate that after six months NOx emissions from road transport in the central zone have reduced by 31 per cent (200 tonnes) compared to a scenario where there was no ULEZ. This is ahead of schedule to meet the 45 per cent NOx emissions reduction expected in the first year.

The EFC reflects the financial authority up to 2022/23. The £37m increase is materially driven by the transfer of the Van and Minibus Scrappage Scheme and the Car & Motorcycle Scheme into the Air Quality and portfolio, providing an additional £48m to support the Mayor's initiative to remove the most polluting vehicles from the roads. This pressure has been offset by more mature costings for projects including an £8m reduction in costs in ULEZ Expansion, and £3m for the Direct Vision Standard. In addition, Selective Catalytic Reduction (SCR) retrofit has decreased by £3m due to reduction in delivery units and release of risk. Spend authority is to the end of 2022/23.



**LOW EMISSION
BUS ZONE
CLEANER AIR
FOR LONDON**



Low emission bus zone, Putney

Low Emission Zone 2020

We are tightening the existing Low Emission Zone (LEZ) standards from 26 October 2020. The emissions standards for lorries, vans and other specialist heavy vehicles over 3.5 tonnes as well as for buses, minibuses and coaches over five tonnes will change from Euro IV to Euro VI. The aim is to encourage increased efficiency of road freight movements and to promote the consolidation of road freight. Owners of vehicles not meeting the tighter emissions standards will need to pay a daily charge to drive within the LEZ.

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 retrofitting up to 4,000 mid-life buses to meet Euro VI emissions. We have currently retrofitted over 3,400 buses and have delivered all 12 Low Emission Bus Zones around a year earlier than planned.

The zones are:

- Putney High Street
- Brixton – Streatham
- A2 Camberwell – New Cross
- A3 Wandsworth – St. John's Hill
- High Road (Haringey) – Green Lanes

- A12 Eastern Avenue (Homerton Road)
- A5 Edgware Road (Kilburn – Maida Vale)
- A21 Lewisham – Catford
- Edmonton to Seven Sisters corridor
- Stratford
- Chiswick High Road – Kensington
- Uxbridge Road – 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. The total number of charge points installed under this scheme exceeded 200 in September 2019 and installations are on track to achieve 225 by December 2019, which will be a major step towards our target of 300 rapid charge points by December 2020.

At present, there are more than 2,000 ZEC taxis licensed in London. Of the rapid charge points that have been installed under this scheme, 73 are dedicated to taxi use. We are working with the taxi trade to identify the most favourable locations and are focusing on the central charging zone for taxi-dedicated sites

following feedback from the taxi trade. We are also developing the designs for two hub sites, one in Greenwich and another to be located in the City of London. The hubs will consist of at least six rapid charge points that can be used simultaneously to support both taxi and public electric vehicle users.

Mayor's Air Quality Fund

The Mayor's Air Quality Fund (MAQF) is a £22m fund over 10 years to support projects by London boroughs to improve air quality.

Projects supported in the third round of the MAQF were announced by the Mayor on 7 June 2019. In this round he is supporting four Low Emission Neighbourhoods and 11 other innovative air quality projects.

Go Ultra Low City Scheme

London's Go Ultra Low City Scheme bid was awarded £13m in capital funding to drive the uptake of ultra-low emission vehicles in the period 2015/16 – 2019/20. To date, 1,200 residential electric vehicle charge points have been installed by boroughs. The final round of funding, £4m, is now open for boroughs to bid for with a submission deadline of 31 October 2019.

Asset investment



Forecast completion year

2021/22

Spend to date (£m)

258

Spend authority (£m)

303

EFC (£m)

634▲

EFC movement post plan (£m)

(35)

2019/20 strategic milestone RAG

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

Ardleigh Green Bridge replacement

All construction works to replace the bridge have been completed and the bridge is fully open to the public. The remaining railway-side work to remove remnants of the old bridge, have been discussed with Network Rail and are planned to be completed by Christmas 2020 when a suitable railway possession is available.

Bus driver facilities

Providing bus driver facilities aligns with the Mayor's Transport Strategy of making the bus network operationally efficient and reliable. It ensures our bus drivers have basic human facilities and helps improve the service to our customers by avoiding the need for unscheduled, mid-route stops, which can cause delays. In addition, it also removes the risk of potential distractions for bus drivers, helping to enable them to drive safely.

This is the second year without any Government operating grant. In the medium to long term, new sustainable funding sources for London's roads will need to be identified.

The EFC covers 2021/22 to provide a direct comparison to the programme as originally approved in 2017/18. The Q2 EFC forecast has increased due to costs relating to the Rotherhithe Tunnel. In September 2018 we conducted a detailed analysis of the ventilation system which would extract smoke and other dangerous fumes from the tunnel in case of fire. This analysis showed that the repair work needs to be carried out urgently.



Bridge replacement works at Power Road bridge, Chiswick

The majority of these new facilities will be stand-alone permanent toilet units, adjacent to the bus stands where they are required. Where possible we are adapting existing infrastructure to ensure integration with the local environment.

Good progress has been made since the Mayor announced increased funding for bus driver facilities in February 2018.

By the end of July 2019, we delivered 17 permanent facilities and 26 temporary facilities on all the 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. We are planning to connect 25 temporary units to the utilities: foul sewer, water supply and power supply, and construct permanent concrete foundations. To date we have made five of the temporary units permanent.

Hammersmith Bridge

Recognising the impact the closure of this strategic route is having on residents and bus operations, we have moved quickly to complete an options analysis with high-level costs and benefits on behalf of the London Borough of Hammersmith and Fulham who own the bridge.

We have jointly agreed with the Borough the intention to restore the bridge 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 progress with the concept and detailed design phases, together with advanced works. In August, 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 the tools we have available to measure, understand and mitigate the effect of the closure on traffic. We are using our network data to make informed 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 the rebalancing of 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. Rotherhithe Tunnel refurbishment works include: renewal of tunnel lighting and its cable support; replacement of the fire main system; provision of resilient power supply; upgrade and reconfiguration of the ventilation system, as well as other mechanical, electrical and civil assets which are life- expired or safety-critical to the operation of the tunnel.

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

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

Public transport

Forecast completion year

2021/22

Spend to date (£m)

253

Spend authority (£m)

347

EFC (£m)

480 ▲

EFC movement post plan (£m)

(86)

2019/20 strategic milestone RAG

The public transport programme oversees London Buses, London Overground, the DLR, London Trams, Emirates Airline, Santander Cycles and the London River Service.

London Overground

Works at White Hart Lane London Overground station were completed in August. There are new station entrances and step-free access from street to platform for the first time.

We have installed, tested and commissioned the Train Protection Warning System (TPWS) to the Richmond branch of the London Overground network. This system is a safety feature to reduce the risk of trains passing into sections of the track until they are clear to do so. The benefit of this project is to allow the new class 710 London Overground train to use this section of track as the new fleet is equipped with this compatible system. Without installing TPWS the new fleet would not run on this section of track thus affecting reliability and the customer benefiting from a newer train fleet. Construction works were completed in the autumn.

At West Hampstead, following the opening of the new concourse to passengers in the previous quarter, the next steps are to complete the platform widening at the western part, which is planned to be completed this autumn.

The increased EFC reflects the transfer of the Rotherhithe to Canary Wharf Ferry to this portfolio, increased spend in critical renewals and all our third-party funded projects are now reported at the gross value. The increased EFC spend authority is to the end of 2021/22.



White Hart Lane station

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

DLR

High-voltage (HV) works have successfully been completed at Stratford Street Market with the testing and commissioning remaining for the new transformer. Once operational it will provide future resilience. Detailed designs have begun for similar works at Poplar depot.

We have finished a number of infrastructure projects, including repainting of bridges and viaducts, and North Route staircase tread replacement. Further infrastructure works, track access, drainage and HV weather protection have commenced.

Replacement of old lighting with LED continues at West India Quay and Poplar.

Track renewals continue to be delivered during weekend closures and non-operational hours. Sections of track around Canary Wharf and Gallions Reach have been completed to date.

The upgrade and fit-out works at Custom House station are progressing while the station remains operational.

The public address system installation has been completed and commissioned. The main radio resilience works have been completed with testing and commissioning planned for this financial year. The contractor will be appointed to upgrade the Automatic Passenger Counting System during this financial year.

London Trams

As part of our commitment to making the tram network safer following the tragedy at Sandilands in 2016, we are continuing to address the recommendations from the Rail Accident Investigation Branch. We have completed a number of initiatives and are currently in the delivery phases of the Physical Prevention of Over-Speeding automatic braking system and the enhanced lighting for the Sandilands tunnel. We continue to evaluate design for tram emergency lighting.

Our renewals programme of works consists of around 37 projects across seven asset groups including fleet, power, civils, systems and permanent way infrastructure.

Key highlights this quarter include the overhaul of the hydraulic power units and brake callipers on the Bombardier CR4000 fleet of vehicles being completed ahead of schedule and on budget. The overhaul of the Bombardier vehicle bogies is also nearing completion.

During a successful ten-day closure of the eastern branch in August, we replaced the worn embedded rails at Chepstow Road, alongside a series of other major works to systems and infrastructure.

A contract to replace the switchgear system at Oaks Road substation is due to be awarded by November 2019. This year's programme for the replacement of parafilm support wires, which hold up the overhead power lines, continues to progress well. We have finalised additional design work for the rebalancing of power within the tram depot and we will be appointing a contractor to deliver the works in the new year.

Following the switch to cashless trams in July 2018, we have removed the existing ticket machines which dated back to the opening of the system, from all tram stops barring one at Wimbledon, which is pending an access agreement from Network Rail to allow removal.

We have commissioned the centre platform at East Croydon, and drivers have been trained on the new operational arrangement. This will improve local operations at East Croydon and increase the resilience of the tram network, particularly in the town centre.

Discussions are ongoing with Network Rail on a revised programme and cost for completing the outstanding works at Wimbledon Platform 10.

Replacement of the two Victorian bridge decks at Blackhorse Lane has been completed with all necessary utility service diversions. We continue with works to reconstruct the highway above the bridges, to be finished during spring 2020, with single-lane traffic operation expected to be in place by the end of 2019.

Tram track renewals between Addiscombe Road and Blackhorse Lane have been successfully delivered, and we are in the planning stage for track renewals at Love Lane, which will take place in March 2020. We completed replacement of the retaining wall at Ampere Way in August 2019.

The systems obsolescence management project enabling works are complete and we are well underway towards finishing the critical migration activities on each tram stop across the network. We will continue the migration through to December 2019 as well as improvements within the control room and the depot.

Bus Safety Standard

Vision Zero aims to achieve zero fatalities and serious injuries on our road network by 2041. The interim target for buses is zero fatalities on or caused by a bus, by 2030. The Bus Safety Standard is the programme of work that is looking at improving the safety of London's buses in working towards Vision Zero.

The Intelligent Speed Assistant (ISA) application controls the speed of the bus using geo-fencing via GPS to the bus, linked to a safety zone speed map. This is an aid to the driver and does not replace the driver responsibility for maintaining the correct speed. As of September 2019, 900 buses have been ISA enabled and a further 200 buses are expected to achieve the same by March 2020. New buses entering service from September 2019 will be ISA enabled as standard.

The Acoustic Vehicle Alerting System (AVAS) is a system that can be fitted to quiet running buses: electric, hydrogen and hybrid (when in electric mode). The system comprises a distinctive sound to alert the public that a quiet running bus is approaching, moving off from stationary or accelerating.

Evidence suggests that current near-side-mounted bus mirrors have blind-spots, which has resulted in cyclists and the walking public being injured. A new near-side blind-spot mirror (BSM) is being rolled out to replace the existing mirror. The off-side mirrors are also being replaced to further reduce blind-spots and avoid driver confusion by standardising the side-mounted mirrors across our fleet. The BSM retrofit started in August 2019 with approximately 18,000 BSMs expected to be fitted to 9,000 buses by March 2020. All new buses will have the BSMs fitted as standard.

Hydrogen buses

To help reach the Mayoral target for all buses to be zero emission by 2037 and meet the Mayor's air quality objectives, we are procuring 20 hydrogen fuel cell buses and building a Hydrogen Refuelling Station (HRS).

The contract has been awarded for the construction of the HRS which is to be built at Perivale Bus Garage and operated by bus operator Metroline. The supplier has produced initial designs and these have enabled the compiling of a planning application for the construction of the HRS which was submitted to Ealing Council who awarded planning permission for the project on 11 September 2019.

Funding is provided by a consortium, including ourselves, various European bodies, and the Office of Low Emission Vehicles for the buses. Orders for the buses were placed in May 2019. In September 2019 the manufacturer of the buses, Wrightbus, entered administration and was subsequently purchased by the Bamford Bus Company on 22 October 2019. We are working closely with the new owners and the funding consortium to determine the most suitable option for the future of this project.

Surface technology

Forecast completion year	Spend to date (£m)	Spend authority (£m)	EFC (£m)	EFC movement post plan (£m)
2023/24	5	85	170 ▼	7

2019/20 strategic milestone RAG

This is a new programme responsible for overseeing strategically important technology projects within our five-year business plan and, from April 2019, to provide 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 have recently finalised a procurement process and have appointed Sopra Steria as a new delivery partner to work with us to design, develop and implement a new incident management system, which will enable us to increase the speed at which we detect and respond to incidents on the road network.

Operational safety and compliance

We are developing a consolidated compliance and enforcement programme to support a more versatile compliance, policing and on-street services operation. This will contribute towards making greater efficiencies and supporting safe, secure and reliable journeys. We are currently in the process of defining the project scope, with a view to confirming a delivery strategy next year.

This programme includes procuring systems and services to support our licensing of taxi and private hire vehicles (PHVs), 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 Periodic Indicative 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 which underpin the bus network, providing better information systems and improving the booking system for Dial-a-Ride.

Other

Technology and data

Forecast completion year

2020/21

Spend to date (£m)

85

Spend authority (£m)

228

EFC (£m)

228 ▲

EFC movement post plan (£m)

33

2019/20 strategic milestone RAG 

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

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

Payments

The Mayor has agreed with our recommendations that when we start operating the local services to Reading, the extension of pay as you go will be for contactless payment cards only and will be introduced from 2 January 2020 to align with other changes Great Western Railway are making to fares to support the introduction of pay as you go. Development work to support the new pay as you go proposition is coming to an end, with testing due to starting this month. Our discussions with the train operating companies on the changes to our agreements with them to facilitate the new pay as you go arrangements are continuing and remain on track. Introduction of the new arrangements will also be subject to the train operating companies' approval of changes being made to how we allocate pay as you go revenue between the parties.

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 Q2 business plan values to deal with slippage into future years. The total value for this adjustment in FY2019/2020 and FY2020/2021 is £38m.

Evergreen programme

The Evergreen programme is aimed at renewing over 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. We will be providing users with modern, fit for purpose IT tools that will help them connect, communicate and collaborate more easily, and be effective in their roles.

The Smart Working Programme is a key enabler for our Accommodation Strategy, and the resulting move to a 7:10 desk ratio in the main office buildings. The programme includes several technology enabler projects from Digital Workplace, such as providing circa 1,700 new laptops for users who are changing their way of working to become more mobile, using IT tools to connect from any location.

Excellent progress has been made on both these programmes. Around 7,500 new 'thin client' PCs have been successfully deployed, with excellent user feedback. These are the 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. A further batch is being acquired to support the Windows 10 roll-out in the coming months.

Since August 2019 over 2,400 users have already been migrated to Windows 10 using 'thin client' devices. To allow these devices to run Windows 10 user desktops they now connect to a new server infrastructure which was successfully installed in our data centres during the summer.

We have also successfully deployed over 2,500 laptops with Windows 10 and Microsoft Office software, including over 1,000 new laptops for the Smart Working Programme roll-out. Approximately 600 additional Windows 10 laptops will be ordered for the remaining waves of Smart Working occurring between November 2019 and March 2020.

Content and collaboration

Microsoft SharePoint is one of our main departmental file sharing applications. However, three versions exist which need to be consolidated into a single version, SharePoint Online, for the future. To date, all SharePoint 2007 sites have been migrated, and 217 SharePoint 2010 sites have also been migrated with only 18 remaining. The next major phase (SharePoint 2013 migration) starts in April 2020.

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 test and development environments for the new version have been completed and the pre-production infrastructure build initiated.

The Intranet Consolidation/Renewal project is to replace the two current portals with a single new portal, based on Microsoft 365 software, with a new front end that facilitates easier search and customisation to individual organisations' data preferences. The project has completed the procurement phase.

Operating and monitoring systems

The Future Bus Systems project has delivered the design documentation for the solution to replace our obsolete bus scheduling tools: BusNet, Caesar and SSTT. The first phase of development has been completed and early user testing has been undertaken. Development and testing activities will continue over the next 12 months.

iBus2 will be replacing the current bus location and performance information systems that underpin all the bus

services. The project has delivered its feasibility options and had the recommended options endorsed through governance, commenced requirements gathering and the procurement strategy is currently being developed.

Hosting – data centre rationalisation and cloud migration

The new lease agreement for our primary data centre has been executed by both parties. Two-thirds of the data centre was vacated and returned to the landlord ahead of the lease end date of 31 July 2019 and circa £24m operating savings will be achieved over the next five years.

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 being made in AWS. The first tranche of a new infrastructure technology was implemented in our data centre as part of the technology refresh project. This delivers further operational efficiencies and ensures our estate remains technically supported.



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Cyber security

As part of our response for compliance with the Networks and Information Systems regulation, submission of the cyber assessments of systems that underpin the critical services we deliver to the Department for Transport (DfT) have been completed. Our Executive Committee has accepted recommendations provided by the Chief Information Security Officer to establish cyber security steering groups aligned with operational business areas, Surface and London Underground, to oversee the mobilisation of cyber security improvement initiatives and control associated risk. Terms of reference for these initiatives to deliver capability improvements within the Cyber Security Incident Response Team (CSIRT) have been mobilised. These are, specifically, to improve security incident event management and handling of calls and contact within the CSIRT function.

Data and analytics

We have upgraded the back office system which calculates the fares for contactless payments. This was essential in order to cope with the increasing demand for contactless payments, which is now the single most popular way to pay for travel. It brings the contactless system into alignment with the new technology deployed ready to determine weekly

capping for Oyster customers. Added benefits are that end-of-day processing of contactless payments to allow settlement with the banks happens more quickly, future fares changes are easier to implement and it reduces back office maintenance and support costs.

Following a successful prototyping of a product which detects fare evasion from patterns in ticketing data (Irregular Travel Analysis Platform – ITAP), the first phase of this is being transitioned into the development area to productionise. Elements within this product use new insight from ITAP and include an operational resource planner for the detection of habitual offenders for targeted intervention (by automated email if registered and onward investigation for prosecution using CCTV technology to confirm identify). We have secured future funding and the prototype work continues by looking at automating the revenue and performance evaluation of a revenue exercise in support of the recruitment of additional operational staff by London Underground.

A solution has been developed to record WiFi connection data in stations, and the first phase of this project, which includes ingestion of the data and our first customer benefits, will be turned on over the next quarter. The customer benefit

will allow our customers to understand a more accurate picture of the average walk-time between interchanges/ platforms, giving a more accurate reflection of journey times.

The Data and Analytics team are continuing to provide analytic services that underpin London Underground's visualisation programme. We are working with the Performance Analysis and Improvement programme and have created various reports and implemented system changes in the past quarter.

Networks

The delivery of the London Underground Connect radio system upgrade has started, with equipment being installed and port and switch acceptance testing completed at all five core sites. The transition to the successor arrangements with Thales are on schedule to complete by November 2019.

Networks continue to deliver infrastructure to support the Home Office's new national Emergency Service Network communications system. We have now installed 322km of tunnel fibre (78 per cent), pulled 366km of the tunnel's leaky feeder (88 per cent) and fixed 143km of this leaky feeder (34 per cent). The outstanding snagging work has been completed at half of the first 25 stations

(Phase IA), installation work is 80 per cent complete at the next 14 stations (Phase IB) and design work is completed for a further 12 stations (Phase IC), with work started at the first five of these stations.

In parallel, we have installed and fixed (and are currently testing) a second leaky feeder (22km) on the eastern half of the Jubilee line to support our 4G Pilot project. A second leaky feeder has been pulled (required for public 4G services) on the Victoria line (47km) which we will start fixing from November. The design work on the Elizabeth line and Northern Line Extension has been completed and opportunities to start installation work on the Elizabeth line are being looked into (access should be secured over the next six months).

The 4G pilot project is now well underway and we continue to target a go-live in March 2020, noting that this is a very aggressive schedule and thus represents a risk to that date. The design work has been completed for all in-scope tunnels and stations and we expect to complete the outstanding base station hotel (data centre) design in the next three weeks. Installation work is underway in all stations and six of the eight tunnel sections. Design work has been completed with three of the four UK mobile operators and we

have signed terms and conditions for pilot participation with the first mobile operator. We expect to complete the outstanding design work and sign terms with the remaining mobile operators during November.

Our project to secure a partner to commercialise our telecoms assets continues according to plan. Networks have received three compliant first-round bids which the project team are currently evaluating before commencement of the dialogue stage of the process in November.

Technical refresh and technical service operation

Our mission-critical systems have been identified, prioritised for restoration and assessed in terms of resiliency. Implementation has commenced for delivering resiliency for underpinning technical services and business services with the highest risk.

The Technology and Data team are in the contract award phase with the successful bidder who will supply service desk operations, second-line support and hardware repair/build services. These services are currently supplied through multiple providers and this procurement process brings them under a single contract and supplier. Contract award

took place in Q2 of 2019/20 with an expected service commencement date in Q4 of 2019/20.

The in-housing of managed service transition activities due to complete in Q3 2019/20 are on track and progressing to expectation.

Enterprise Resource Planning (ERP)

In October 2019, the Oracle decommissioning project successfully went live, integrating the Metro Maximo asset management system with our SAP ERP system. This improved solution is used for asset maintenance on the Jubilee, Northern and Piccadilly lines and has delivered a way of managing materials and inventory for London Underground. This was achieved by developing common processes for our people between the systems, allowing us to decommission Oracle, a legacy system of the former TubeLines. The project, delivered in-house by the Technology and Data team, was successfully implemented on time, on budget and has already delivered significant savings.

In June 2019 we delivered the new electronic payslip service for all our people. This new safe and secure system has replaced the paper payslip and is accessible using both TfL and personal devices.

For our Finance teams, in August 2019 we re-implemented the SAP Business Planning and Consolidation system to reduce manual activity and increase finance efficiency. The system is being populated with data ready for full use by financial year end.

Our ERP technology transformation continues with selection of AWS as our public cloud hosting provider for SAP. Work is underway to prepare the SAP platform for migration onto AWS which will increase SAP performance, remove several technical support risks and put in place the technical prerequisites required for a full upgrade of SAP over the Business Plan. This is a significant enabler for our ERP upgrade strategy over the next five years.

Contact centre operation

The Photocard Concessions Project has seen progress since contract commencement. Technical testing has begun and external testing has taken place with successful outcomes giving us confidence in a quality product for our customers. Delivery is on track for the new online customer portal in the new year.

Growth Fund



Forecast completion year

2024/25

Spend to date (£m)

1.5

Spend authority (£m)

144

EFC (£m)

144

EFC movement post plan (£m)

0

2019/20 strategic milestone RAG



£0.4m towards Walthamstow Central and £0.8m towards Ilford station due to transfer shortly.

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 & 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 this year. All these improvements support new housing developments. Our investment in the transport infrastructure has been supported by financial contributions from developers and other sources, including the GLA.

Sutton Link

A detailed option selection process has been undertaken, 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 local 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

The Elmers End scheme is currently funded for design development and the acquisition of consents and necessary land. We are continuing to liaise with the London Borough of Croydon and others on funding opportunities to deliver these and other improvements to the London Trams network.

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.



Construction progress at Tottenham Court Road Elizabeth line station

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	79	94	95	1

2019/20 strategic milestone RAG

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 is also nearing completion and final inspections were finished in early September. The contractor has been slow to progress as-built paperwork required for the formal handover but committed to seeing it is delivered to the required quality.

On the Great Western section lift schemes at Hanwell, Iver, Langley and Taplow, all critical possession-related work has been completed with the remaining tasks predominantly being fit-out work and testing and commissioning. Works at Langley and Hanwell stations have slipped due to previous possession cancellations and issues with existing

asset condition respectively, but the contractor has sought to mitigate the effect. Notwithstanding this, it is likely that completion at these sites will be in spring 2020.

MTR Elizabeth Line is continuing its station refurbishment programme with work on the locally listed Victorian booking hall recently completed at West Drayton which has been well received by both staff and customers. Works are ongoing at Hanwell, where again asset condition is proving an issue, but activities are being resequenced to ensure that the benefits of the work (new waiting rooms and refurbished toilets) are brought to customers as early as possible. In early 2020 MTR will start on the refurbishment of the Langley station building which will also facilitate the installation of automatic ticket barriers.



Rolling stock

Forecast completion year

2020

Spend to date (£m)

959

Spend authority (£m)

1,149

EFC (£m)

990

EFC movement post plan (£m)

10

2019/20 strategic milestone RAG

The EFC has decreased this quarter due to a reassessment of the remaining scope.

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 (ATO) signalling continued in the central section tunnels of the Elizabeth line, including transitions to the Network Rail mainline routes to the east and west and running multiple trains in the same tunnel under the control of the ATO system. Train and train signalling control software is progressing to the end of the development stage. The functionality for the next phase of the Elizabeth line – trial running – has been confirmed and is planned into the respective software versions on the train and the wayside which are scheduled to be tested in the early part of 2020.

Integration testing of the European Train Control System (ETCS) for operation to Heathrow Airport has completed. Safety-assurance submissions are being prepared for industry stakeholders (including the Office of Road and Rail) pursuant to authorisation to operate ETCS-fitted Elizabeth line trains for driver training and then passenger service.

Elizabeth line trains with integrated ETCS and ATO signalling equipment (but using legacy Network Rail AWS/Train Protection & Warning System train protection) continue to operate selected passenger services between Paddington and Hayes & Harlington. Driver training runs to Maidenhead and Reading on the Great Western Main Line with 23,000 miles accumulated in the quarter.



Class 345 trains at Old Oak Common depot



Crossrail

Forecast completion year

TBA

Spend to date (£m)

*

Spend authority (£bn)

17.6

EFC (£m)

*

EFC movement post plan (£m)

*

2019/20 strategic milestone RAG

Crossrail Limited's latest assessment is that the opening of the central section of the Elizabeth line will take place as soon as practically possible in 2021.

At the Crossrail Board on 7 November, they stated they will need further time and funding to complete the complex testing of trains and managing the handover of the railway safely and reliably into passenger service.

Full testing is due to get underway next year and there can be no shortcuts on this hugely complex project. The latest assessment is that the opening of the central section of the Elizabeth line will not occur in 2020 but it will open as soon as practically possible in 2021.

The latest cost projections indicate that Crossrail will need a further £400 million to £650 million over the revised funding that was agreed with the Mayor and Government in December 2018.

We are currently discussing with the Department for Transport (DfT) how these additional costs will be funded. Any potential financial impacts to revenue will be considered in our 2019 Business Plan.

While this is disappointing news, as joint sponsors with the DfT, we will continue to work closely with Crossrail Ltd to ensure this vital project is delivered safely and as quickly as possible.

This quarter, Rail for London (Infrastructure) Limited (RfLI), the infrastructure manager for the central section of railway, has taken on landlord responsibilities for Victoria Dock Portal and Pudding Mill Lane following a successful handover from the project in August and September, respectively. As the first elements to be handed over, Crossrail and RfLI have been able to test the handover completion process and learn lessons which will be used for the remaining elements.

The hoarding in the ticket hall at Farringdon station was removed in September. This means most major work at the station is now complete so hard hats and hi-vis jackets are now no longer necessary for everyone on-site.

* This information is withheld for reasons of commercial sensitivity

Siemens and Bombardier collaboration remains strong with senior resources co-located in Westferry Circus and with the right level of CEO engagement, including recent meetings in Germany with senior officials from Crossrail, Siemens and Bombardier. This has been a major achievement for the programme and will ultimately de-risk the development and assurance process.

In July, the first nine-car (full-length) train in TfL Rail passenger service was successfully introduced in the western section between Hayes & Harlington and Paddington mainline station. This is an important step in operating the full-length trains which will be used for future opening stages of TfL Rail and the Elizabeth line.

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	01-Jan-20	23-Feb-20	■
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	01-Nov-19	■
Network extensions			
Northern Line Extension ■			
Track installation complete	28-Jun-19	03-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	14-Nov-19	■

*Due to the legal challenge at post quarter end, the forecast date for the contract award is now 14 November

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)	04-Aug-19	03-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	07-Feb-20	■
London Underground			
Station renewals and enhancements ■			
22 lift and escalator replacement and refurbishments complete on London Underground	31-Mar-20	12-Mar-20	■
Tottenham Hale – new station entrance and concourse opens to the public	31-Mar-20	14-Dec-20	■
<p>The construction of the new interchange requires significant Network Rail access based on possession working. The current programme now incorporates three agreed possessions with any further works undertaken in engineering hours. This programme based on this approach has now been agreed and is reflected in the latest forecast. Mitigations include a temporary gateline relocation to unlock phase four of the works and in addition we are working collaboratively with our contractors to reduce construction timescales and to mitigate impact.</p>			
Accessibility ■			
Eight more London Underground stations become step-free	31-Mar-20	30-Jun-20	■
<p>Currently four out of eight stations are forecasting completion by the milestone date. A recovery plan for the remaining stations has been received. We are working collaboratively with our contractors to reduce construction timescales and lift installation durations need to be sustained to mitigate this delay.</p>			
Track renewals ■			
Install 7.5km of new track across the London Underground network	30-Mar-20	04-Mar-20	■
Rolling stock renewals ■			
Victoria line Fleet Programme Lift – first train enters production	31-Jul-19	01-Jul-19	Complete ■
Jubilee line fleet refurbishment is complete and all trains are compliant with the Rail Vehicle Accessibility Regulations (RVAR)	31-Jan-20	28-Nov-19	■

Milestone description	Plan date	Actual/ forecast date	Status
Central line – begin refurbishment and life extension work on first production train	31-Mar-20	22-Oct-19	■
Signalling and control ■			
Piccadilly line interim signal control upgrade complete	26-Jan-20	28-Oct-19	■
Power cooling and energy ■			
First solar panels installed, representing the commencement of large-scale solar generation on our buildings (BIU Tranche1)	18-Feb-20	13-Feb-20*	■
*A further decision was made to delay the forecast date to 26 March 2020 (37 days late) and will be reported in Quarter 3.			
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 ■
Cycle Superhighway 4 – detailed design for Jamaica Road signed off	30-Aug-19	04-Jul-19	Complete ■
Direct Vision Standard – launch of system to enable heavy goods vehicle drivers to request Direct Vision Standard permits	29-Oct-19	28-Oct-19	■
Cycle Super Highway 9 – completion of detailed design for Kew Bridge section	06-Dec-19	13-Sep-19	■
Air quality and environment ■			
Launch of central London ULEZ scheme	08-Apr-19	08-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	01-Dec-19	09-Aug-19	Complete ■
Bus driver facilities – install permanent facilities on 42 routes	31-Mar-20	28-Feb-20	■

Milestone description	Plan date	Actual/ forecast date	Status
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 to support the Elizabeth line extension to Reading	08-Dec-19	08-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	■

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Programmes and Investment Committee



Date: 18 December 2019

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 November 2019. It describes the work undertaken since the last report presented to the Committee on 23 October 2019.
- 1.2. A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendations

- 2.1 **The Committee is asked to note the Independent Investment Programme Advisory Group's Quarterly Report and 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 for the Committee and the Audit and Assurance Committee.
- 3.2 There are no specific recommendations in the IIPAG Quarterly Report.
- 3.3 The TfL Project Assurance team continue to track progress against the recommendations made by IIPAG through its reviews of TfL's projects and programmes.

4 Management Response to IIPAG Quarterly Report

- 4.1 In its quarterly report IIPAG note the identification of a new issue relating to the availability of key documents for project assurance reviews. IIPAG consider that TfL Project Assurance should define the minimum documentation requirements for project assurance reviews, and to ensure that reviews only take place when these are met, except in exceptional circumstances.

- 4.2 At the meetings held at the start of the process to review a project or programme, we will ensure that there is adequate first line assurance in place, with appropriate project documentation available as evidence. Where it is found that first line assurance has not been undertaken to an adequate level we will not progress with the project assurance review until such time that this is addressed, except in exceptional circumstances. We are revising the terms of reference for project assurance reviews to further clarify the documents which are to be made available as a minimum to support each project review. Our focus continues to be issuing reports from our external experts no less than two days prior to the review meeting.
- 4.3 Further to the discussion with the Chair of the Committee on the approach to programme reviews, we are implementing a revised process with a greater focus on identifying issues relating to risk, innovation, external impacts and issues where the Committee can assist.
- 4.4 IIPAG highlight the progress on its cross cutting work which includes project reporting. IIPAG's findings have been considered at director level and the reporting team within TfL's Programme Management Office has subsequently been tasked with working with the relevant IIPAG member to take this forward.
- 4.5 TfL Project Assurance has supported IIPAG in its review on the effectiveness of the first and second lines of defence in project assurance and is now considering how to implement IIPAG's recommendations. An update will be provided to the March 2020 meeting of the Committee.

List of appendices to this report:

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

Appendix 1: IIPAG Quarterly Report (November 2019)

List of Background Papers:

None

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Independent Investment Programme Advisory Group – Quarterly Report (November 2019)

This paper will be considered in public

1. Summary

- 1.1. This is a report of the activities of IIPAG during September and October 2019 (i.e. since our last report). It provides an update on emerging cross-cutting or systemic issues, and our cross-cutting work programme.

2. Recommendations

- 2.1. We make no new recommendations in this report. We note below an issue about documentation for Project Assurance Reviews. This will be picked up in recommendations from our current review of the first and second lines of defence.

3. IIPAG reviews of projects and sub-programmes

- 3.1. It has been a relatively short time since our last report. In that time IIPAG has participated with PA in the following reviews.

Project Assurance Reviews
LU Lifts and Escalators
CLIP
LU Stations
Bakerloo Line Upgrade and Extension
Cycle Future Highway 5
Cycle Future Highway 9

- 3.2. Our reviews continue to find a lot of good work in TfL, but they have also identified a number of issues and recommendations.
- 3.3. We have also continued to engage with the business through participation in Investment Group, LUX and ST Leadership Group (previously STIB).

4. Recurring themes

- 4.1. In our last report we noted six issues that were common to many of the reviews we had undertaken so far. These were: capability and resources; programme and portfolio management; cost and risk; schedule pressure; governance; and value for money. These have continued to be common themes in the reviews we have undertaken in the past 2 months, though we note that resource pressures have been eased in some areas (see below).
- 4.2. From some recent reviews we have identified a further issue around the availability of key documents for Project Assurance Reviews (PARs), especially when the project teams are seeking a significant decision such as Programme or Project Authority.

- 4.3. In a number of cases the business case has been in draft and subject to updating. There have been cases of insufficient assurance of cost estimates. In many cases drafts of the key submissions seeking programme or project authority are not available at the time of reviews. In one case the relevant Pathway gate (the first line assurance) had not occurred before the second line PAR. Papers, including from External Experts, often arrive very close to the date of the review. Whilst we recognise the schedule pressures that some projects face, we do not consider that such practices are ideal, and they diminish the effectiveness of assurance reviews.
- 4.4. We consider that TfL Project Assurance should define the minimum documentation requirements for PARs, and ensure that reviews only take place when these are met, except in exceptional circumstances. IIPAG will shortly report on the effectiveness of the first and second lines of defence in TfL projects and we expect to recommend improvement in this area.
- 4.5. Following discussion with the Chair of the Programmes and Investment Committee, we are also working with TfL Project Assurance to review the purpose of and approach to Sub Programme Reviews, to ensure that the reviews and our advice are as helpful as possible to decision makers.

5. Management progress on IIPAG recommendations

- 5.1. We noted in our last report that a detailed exercise was underway to review the future demand for engineering resource and how that demand could be met. We have recently been informed that additional engineers have been recruited in the past few months and that TfL Engineering believe that the position is now stable.

6. Cross-cutting work

- 6.1. Our annual work programme identified a number of areas which we would consider on a cross-cutting basis. We continue to make progress on these. We have completed a review of project reporting in which we found that reporting is inconsistent, and the process of reporting is burdensome and inefficient. More importantly, we found that leaders are not always presented with all the information that they require to make the best decisions. We have proposed a pragmatic approach to improvement which will be discussed at the November 2019 Investment Group meeting.
- 6.2. A review into the effectiveness of the first and second lines of defence in project assurance is nearly complete. We expect to be able to report on this to the next meetings of the Audit and Assurance Committee and the Programmes and Investment Committee.
- 6.3. Fieldwork for the Benchmarking review is nearly complete. Work is underway for the reviews on value for money and TfL standards. Reports are in preparation on engineering resource and project initiation.

List of appendices to this report:

None

List of Background Papers:

None

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Programmes and Investment Committee

Date: 18 December 2019

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 15 September 2019 and 29 November 2019. A total of 20 reviews were undertaken, consisting of four programme and 16 project assurance reviews.
- 1.2 These reviews gave rise to 56 recommendations being made, of which five were considered to be critical issues. Critical issues should be addressed before proceeding to the next stage.
- 1.3 Key findings from the reviews undertaken are:
 - (a) continued cost pressure on a number of projects;
 - (b) business cases not consistently providing conclusions; and
 - (c) early cost estimates often being too optimistic and not presenting uncertainty by providing point estimates rather than a cost range.
- 1.4 A paper is included on Part 2 of the agenda which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendation

- 2.1 **The Committee is asked to note the 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 Four programme reviews were undertaken between 15 September and 29 November 2019, with IIPAG involved in all four. In the same time period 16 project assurance reviews were undertaken, with five of these involving IIPAG.

- 4.2 From the programme reviews undertaken a total of 36 recommendations were made by TfL Project Assurance, and agreed with the respective project teams, of which:
- (a) four were critical issues; and
 - (b) 32 were general recommendations.
- 4.3 From the project assurance reviews undertaken, IIPAG made 19 general recommendations and one critical recommendation, 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.

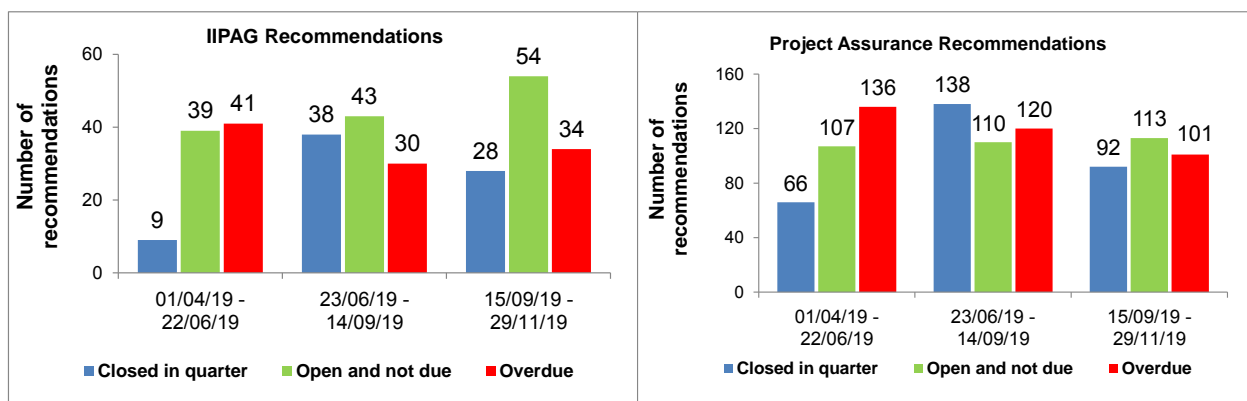


Figure 1: IIPAG Recommendations

Figure 2: Project Assurance Recommendations

- 4.6 We are continuing to work with project teams to ensure that recommendations are acted upon and closed within an appropriate timescale once evidence has been provided. As of Quarter 2 this year, the TfL Project Assurance team also have a key performance indicator that requires 90 per cent of all overdue recommendations to be closed out within three periods of overdue date in order that they receive the right level of scrutiny.

List of appendices to this paper:

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

Appendix 1: Overview of Recommendations

List of Background Papers:

None

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Appendix 1: Overview of Recommendations

Critical issues agreed with the respective project teams

Project: Direct Vision Standard (management response now closed)		
Raised by	Critical Issue	Management Response
Project Assurance	The current preferred option estimated final costs is £10.3m over financial authority and the scheme is unbudgeted.	Following value engineering and revised delivery costs the current cost pressure on the Direct Vision Standard (DVS) project has reduced to £10.0m, with a £6.5m pressure in 2019/20, however, Ultra Low Emissions Extension and Low Emissions Zone 2020 are favourable to budget this year by a total of £14.8m, which is proposed to be utilised for the DVS project.

Project: Civils Programme		
Raised by	Critical Issue	Management Response
IIPAG	A detailed plan should be prepared as soon as possible to address the 2019/20 underspend, and the need for a significant ramp up in 2020/21. A further targeted assurance review should be held, with appropriate senior programme attendance, to review and assure the revised plan prior to the submission of the authority paper to London Underground Executive (.	As part of the 2020/21 budgeting and milestones process, the plans are being critically reviewed to ensure that a deliverable and resourced programme is in place for 2020/21 delivery. The significant ramp up has now been removed as confidence in asset performance and safety risk is being adequately managed. Periodic programme milestones linked to expenditure have been added to all civil programmes with relevant expenditure, to facilitate monitoring of expenditure and prioritise resource allocation.

Project: Borough Crossrail Complementary Measures		
Raised by	Critical Issue	Management Response
Project Assurance	Action to be taken to close the £0.8m funding gap which falls in 2020/21.	We have sufficient Financial Authority to spend this year, £26.7m in total, the total Programme and Project Authority request is £25.1m. Additional Financial Authority will be agreed as part of the 2019/20 budgeting activity, before the £2.4m spend for next year.

Projects: Cycleway 9 East and Cycling Future Route 5

Raised by	Critical Issue	Management Response
Project Assurance	<p>Assessment of cycle programme finances should fully consider the evidence available to inform the over-programming and estimating uncertainty assumptions. Evidence should be provided to demonstrate that forecast cycle programme spend is being monitored against financial authority, that potential variances are being identified, that suitable actions are being proposed to address variances and that senior management have visibility over this process and the related decision making.</p>	<p>The relatively volatile nature of the cycling programme means the pipeline of activity must accommodate future slippage for individual projects in order to maintain delivery against overall programme objectives. This leads to a requirement for activity over-programming so that where slippage occurs replacement activity is available to slot into place.</p> <p>Existing reporting associated with the annual business planning round and quarterly forecasting allows for the effects of movement in cost and schedule at a project level to be demonstrated at a programme level. In the current business planning round, greater emphasis will be placed on portfolio management for Healthy Streets programmes to ensure that predicted slippage is already priced into the overall business plan numbers. This will lead to a revised approach to portfolio and programme level reporting, which is being developed for the new reporting format to be produced for the new financial year.</p>

Programmes and Investment Committee



Date: 18 December 2019

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 the 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 23 October 2019, there have been:
 - (a) no decisions taken by Chair's Action;
 - (b) no Mayoral Directions within the Committee's remit;
 - (c) the Commissioner has approved Procurement Authority for one project, relating to Tottenham Hale Station Upgrade Project; and
 - (d) the Chief Finance Officer has approved Procurement Authority for two projects, relating to Pitta cladding for Crossrail station and saloon lighting for Crossrail stations.
- 1.3 There has been no use of Programme and Project Authority granted by the Commissioner or Chief Finance Officer.
- 1.4 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.

2 Recommendation

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

3 Use of authority delegated by the Board since 23 October 2019

- 3.1 There have been three uses of authority delegated by the Board since the meeting on 23 October 2019.

4 Use of Chair's Action since 23 October 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 23 October 2019.

5 Programme and Project Authority Approvals since 23 October 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 Programme and Project Authority for any project.

Approvals by the Chief Finance Officer

- 5.6 Since the last meeting of the Committee, the Chief Finance Officer has not approved Programme and Project Authority for any projects.

6 Procurement Approvals

Approvals by the Commissioner

- 6.1 Since the last meeting of the Committee, the Commissioner has approved one Procurement Authority request 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 three Procurement Authority requests in respect of matters within the Committee's remit.

7 Mayoral Directions to TfL

- 7.1 The Greater London Authority Act 1999 (as amended), permits the Mayor to issue to TfL general directions as to the manner in which TfL is to exercise its functions or specific directions as to the exercise of its functions (or not to exercise a power specified in the direction). Directions are also often made in relation to the implementation of matters in respect of which the Mayor delegates statutory powers to TfL.
- 7.2 The Mayor makes Mayoral Directions through Mayoral Decisions. Papers for Mayoral Directions set out the financial and other implications. If those implications change over time, that will be reported to the 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 Procurement Authorities approved by the Commissioner or Chief Finance Officer

List of Background Papers:

None

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Appendix 1: Summary of Procurement Authority Approvals

Approval Date	Contract / Project Name	Value (£k)	Approval
09/11/2019	Tottenham Hale Station Upgrade Project	34,320	Commissioner
30/10/2019	Pitta cladding in Crossrail stations	1,546	Chief Finance Officer
30/10/2019	Saloon Lighting for 92TS for Central Line Improvement Programme (CLIP)	4,700	Chief Finance Officer
18/07/2019	Finsbury Park Step Free Access and Development works	7,330	Chief Finance Officer

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Programmes and Investment Committee



Date: 18 December 2019

Item: Air Quality Programme

This paper will be considered in public

Summary

- 1.1 This paper represents the third annual submission of the Surface Transport, Air Quality (AQ) Programme to the Committee, detailing the request for budgeted Programme and Project Authority for the years 2019/20-2023/24.
- 1.2 The focus of this paper is to:
 - (a) provide an update of the AQ Programme's progress in delivering projects from the previous annual submission to the Committee in December 2018 to date;
 - (b) summarise the planned delivery from December 2019 up to the next annual submission to the Committee in December 2020, as well as key challenges and opportunities for the year ahead;
 - (c) provide assurance to the Committee on the progress of the AQ Programme, both in terms of delivery and in setting up robust arrangements for future years; and
 - (d) provide a detailed cost and funding breakdown, including third party elements.
- 1.3 In 2018, the Committee approved a total of £280.2m of Programme and Project Authority for the AQ Programme. Since that approval, four additional projects have been included in the AQ Programme with associated authorities; HGV Safety Permit Scheme (DVS), the Camera Refresh Project, Van and Minibus Scrappage Scheme, and Ultra Low Emission Zone (ULEZ) Car and Motorcycle Scrappage Scheme. A further £24.0m has also been included for Taxi Delicensing. The current total re-stated Programme and Project Authority for the AQ Programme is £379.4m.
- 1.4 A further £30.0m of Programme and Project Authority was approved by the Committee in March 2019 for AQ projects providing a total of £409.4m.
- 1.5 This paper requests approval for additional Programme and Project Authority of £100.6m, to bring the total Programme and Project Authority to £510.0m (table below).

Air Quality Programme				
Existing Financial Authority for 2017/18 – 2023/24	Estimated Final Cost for 2017/18 – 2023/24	Restated Existing Programme and Project Authority Requested for 2017/18 – 2023/24	Additional Authority Requested for 2019/20 – 2023/24	Total Programme and Project Authority Requested for 2017/18 – 2023/24
£512.2m	£517.0m	£409.4m	£100.6m	£510.0m

- 1.6 This authority request covers financial years 2019/20 – 2023/24. The AQ Programme will return annually to the Committee to renew and validate a rolling approval.

2 Recommendation

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

3 AQ Programme

- 3.1 The AQ Programme improves transport’s impact on air quality and climate change through a programme of measures targeted at vehicles in TfL’s contracted and regulated fleets, and all vehicles driving in London. The AQ Programme also ensures the integration of the new schemes with existing charging schemes and contributes to the policy development and customer research that will enable evolution in emissions charging.
- 3.2 As air pollution is one of the most significant challenges facing London – affecting children’s lung development, increasing the risk of strokes, and creating a social inequality issue for more vulnerable people – TfL is delivering improvements through a number of schemes. The portfolio has delivered significant achievements within the past year including the launch of the central London ULEZ, progress on the installation of electric charging infrastructure and the introduction of low emission buses. The Mayor’s Transport Strategy (MTS) sets out the Mayor’s vision that ‘London’s transport network needs to contribute to the meeting of legal air quality levels as soon as possible and to the achievement of a zero-carbon city by 2050, thereby protecting the health of Londoners and demonstrating a commitment to tackling climate change.’ TfL is also under a legal duty to take appropriate action to minimise road traffic accidents and has developed the HGV Safety Permit Scheme to address the most dangerous heavy goods vehicles.
- 3.3 Certain areas of the Capital have exceeded either the annual mean or the hourly limit values for NO₂ this year, this is likely to continue beyond 2020 unless more action is taken. Without dedicated action, CO₂ emissions from transport are unlikely to decrease quickly enough to support the Mayor’s ambition for a zero carbon city by 2050. The current investment programme is producing the action necessary to facilitate the required change.
- 3.4 The MTS also establishes the Mayor’s vision to ‘create a future London that is not only home to more people but is a better place for all of those people to live in’. As

such the MTS tasks Transport for London (TfL) to adopt a ‘Healthy Streets approach’ at the heart of all its decision-making.

3.5 The AQ Programme comprises three areas as shown in Figure 1:

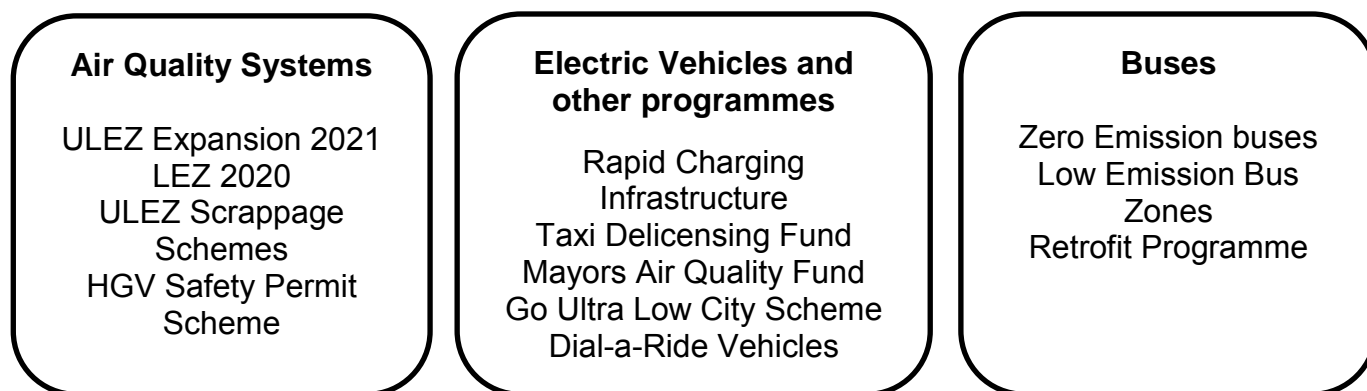


Figure 1: Air Quality Programme and workstreams

- (a) **Air Quality Systems (formerly Air Quality Management):** Major projects to meet legal air quality limits and to deliver Healthy Streets outcomes. The HGV Safety Permit Scheme, which is concerned with reducing casualties from accidents involving HGVs, is included in this category as it is being delivered through the same contracts, business and enforcement operational systems as other schemes in Air Quality Systems;
- (b) **Electric Vehicles:** Projects on the Transport for London Road Network (TLRN) and Borough roads that encourage the shift to electric vehicle ownership, through the upgrading of TfL fleet, the provision of charging infrastructure, supporting London boroughs to improve air quality; and
- (c) **Buses:** Projects and programmes that provide air quality improvements through upgrades to our bus fleet.

3.6 This paper outlines the key deliverables for the AQ Programme; focusing on the reduction in road vehicle emissions. The Programme forms part of the wider strategy for TfL to improve air quality and reduce carbon emissions from other sources, such as lighting, London Underground trains and at key road hotspots, which are all embedded within other investment portfolios.

3.7 Improving air quality and road safety for Londoners is vital; TfL is delivering on this through a number of schemes:

- (a) ULEZ central (April 2019) and its expansion (October 2021) – London is the first city in the world to implement a 24-hour, seven day a week Ultra Low Emission Zone, inside which the world’s toughest vehicle emissions standard has been introduced to help reduce toxic air pollution and protect public health;
- (b) from 26 October 2020, Low Emission Zone (LEZ) emissions standards will be tougher for heavier vehicles. Current LEZ emissions standards set a limit for how much particulate matter (PM) a vehicle may emit. The tougher standards will also set a limit for nitrogen oxides (NOx) for some vehicles.

- (c) HGV Safety Permit Scheme (October 2020) – TfL took the initiative to develop the world’s first objectively measured direct vision standard, in order to influence the safety requirements for HGVs at the point of manufacture. Directly addressing the potential for conflict with vulnerable road users by encouraging the use of HGVs that have greater driver visibility and (for HGVs over 12 tonnes) mandating that those not meeting a minimum DVS rating must fit additional equipment to improve their safety; and
- (d) Bus Retrofit (2019) – Following the successful retrofit of over 2000 Euro III buses to Euro IV standard, TfL challenged the industry to uplift Euro IV and V buses to Euro VI. Through industry engagement and trials TfL has successfully delivered one of the lowest emission bus fleets in the world.

3.8 Figure 2 displays the proposed delivery timeline for the AQ Programme. This strategy will enable us to deliver key benefits including improved air quality, better quality of life and health of Londoners, and increased use of newer and cleaner vehicles - including buses, taxis and private hire vehicles.

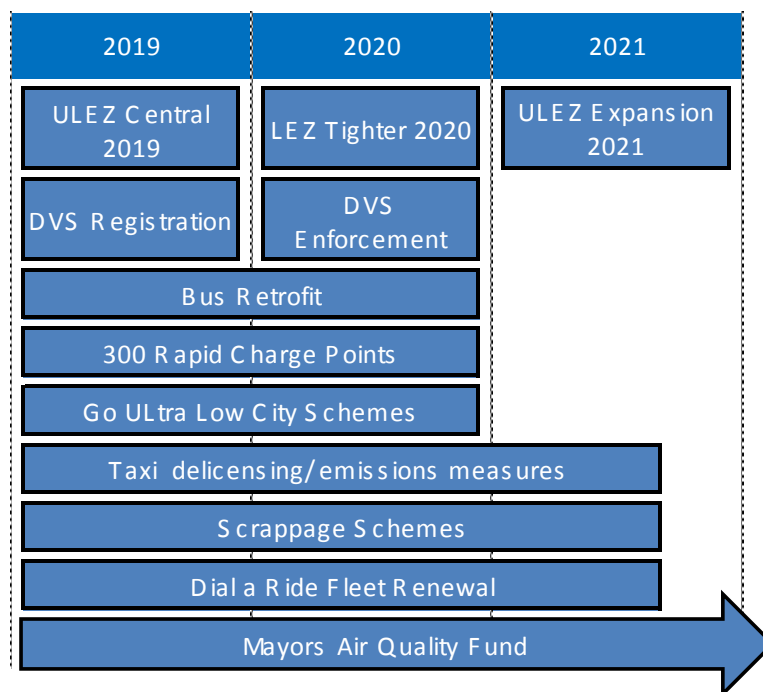


Figure 2: Air Quality Programme Timeline

3.9 In order to drive efficiencies, opportunities have been identified across the business to align projects that utilise existing operational systems together within this portfolio. This has resulted in the in-year transfer of:

- (a) **Camera Refresh**, £11.9m, transferred in May 2019: this project has been combined with the ULEZ Expansion 2021 (ULEX) ‘Detection and Enforcement Infrastructure’ work-stream in order to develop a holistic approach to the extension and refresh of TfL’s camera network;
- (b) the **HGV Safety Permit Scheme (DVS)** was transferred following the submission to the Committee in May 2019, to improve efficiency and avoid the risk of inconsistency, with Ultra Low Emission Zone Extension ULEX and Low Emission Zone (LEZ) 2020 which are being developed in parallel; and to ensure they are all managed with the same governance; and

- (c) in addition, two new **ULEZ supporting Scrappage Schemes**, fully funded by the Greater London Authority, have been launched in year, to support owners of older, more polluting vehicles and encourage more sustainable travel.

Scheme	Authority Transferred	Funding Source
Camera Refresh	£11.9m	Other – Operational spend (Transfer approved by the Committee in May 2019)
HGV Safety Permit Scheme (DVS)	£4.4m	Surface Technology (Transfer approved by the Committee in May 2019)
ULEZ Supporting Scrappage Schemes	£48.0m	GLA Funding

Table 1: Schemes transferred or added into the AQ Programme

- 3.10 The financial implications, including current financial position, over-programming and value-engineering are detailed in Section 9. The AQ Programme is ambitious, and there are both significant challenges and opportunities for delivery; these are set out in Section 6.
- 3.11 TfL cannot meet this ambition in isolation, London’s boroughs are vital to delivering the AQ Programme and London Councils Transport and Environment Committee (TEC) has been an essential part of the HGV Safety Permit Scheme. Key projects within the AQ Programme are directly delivered by Boroughs, such as the Mayor’s Air Quality Fund and the Go Ultra Low City Schemes. Partnerships between TfL, Boroughs, third parties (e.g. London Councils) and stakeholders are crucial to delivering the AQ Programme effectively.
- 3.12 All of the measures in the AQ Programme will deliver improvements to air quality across the capital. However, it is also important to recognise the risk that Heathrow expansion creates to delivering this outcome and how we are working to address this. The expansion of Heathrow is subject to a Development Consent Order (DCO) approval and the airport recently completed the second consultation exercise for this.
- 3.13 We will continue to provide progress updates to the Committee on a quarterly basis. The next annual submission to the Committee will be in December 2020.

4 AQ Programme performance

Key Policy Updates

- 4.1 A number of AQ supporting policy and strategy developments have taken place over the last 12 months, these are described below.
- 4.2 **Electric Vehicle (EV) Infrastructure Delivery Plan** – launched by the Mayor in June 2019, to set out the expected scale of infrastructure required by 2020 and

2025 to support EV growth. It explores barriers and opportunities and future areas of focus, including the installation of rapid charging hubs and the establishment of a co-ordinating body for the delivery of EV infrastructure. Currently the onus is on the public sector to provide this infrastructure, however the EV delivery plan's aim is to facilitate a shift to the private sector; through utilisation of a charter of commitments signed up to by external partners.

- 4.3 **Taxi Age Limits** – Taxi emissions have been tackled through the introduction of the requirement, on 1 January 2018, that only zero emission capable (ZEC) taxis can now be licensed; this has been supported by the launch of a taxi delicensing scheme. Despite these changes, taxis are now the largest single source of road transport NOx in Central London.
- 4.4 As a result, in Spring 2019, we consulted on changes to taxi age limits; which included: mandating the maximum taxi age limit, phased reduction of the taxi age limit to 12 years by 2022 and removing age limit exemptions for hardship, historic and classic/niche and alternative fuel vehicles. Following the consultation, the changes were implemented on 1 November 2019. Additionally, the taxi delicensing offer was improved by increasing the payment level on a first come first served basis.
- 4.5 **Congestion Charge policy changes** – In order to ensure the Congestion Charge remains effective in reducing the use of cars in central London, a number of policy changes have been implemented. On 8 April 2019, the Ultra Low Emission Discount was replaced with the Cleaner Vehicle Discount for the Congestion Charge. The new, phased discount is currently only applicable to ZEC vehicles, tightening to pure electric vehicles in October 2021. The discount will be removed entirely in 2025.
- 4.6 **Local Zero Emission Zone guidance** – In September 2019, TfL issued guidance to support the MTS proposal of seeking to implement Zero Emissions Zones (ZEZs) in town centres across Greater London from 2020. Aimed primarily at London boroughs, it sets out the policy context, different approaches, parameters for the design of the zones and key considerations for implementation, as well as possible supporting measures.
- 4.7 London Borough of (LB) Hackney has already introduced the first ZEZ-type scheme in Shoreditch (in partnership with LB Islington) with their ULEV Streets Scheme; and City of London will be launching a new ZEZ in Beech Street in the Barbican area in early 2020.

Financial performance

- 4.8 In terms of headline financial performance in 2018/19, the AQ Programme was £18.0m below the Financial Authority. £3.0m can be directly attributed to savings mainly from the successful delivery of the central London ULEZ. The remainder was due to a change to accounting treatment for Selective Catalytic Reduction (SCR) Bus Retrofit which spread the expenditure over the life of the bus contracts, which was partly offset by recognising Taxi Delicensing costs at the point applications are validated rather than when they are paid.
- 4.9 In 2019/20 to date the AQ Programme has achieved excellent delivery in terms of meeting outcomes; however, several projects e.g. LEZ 2020 and HGV Safety

Permit Scheme exceeded their budgeted estimated final cost. The AQ Programme has achieved value engineering/management savings, to bring the programme within Financial Authority for 2019/20. There is a £4.8m variance in Programme estimated final cost (EFC) versus Financial Authority which relates to additional Mayor's Air Quality Fund (MAQF) funding for future years which will be addressed in the next annual submission. The project teams will continue to identify value engineering opportunities within the AQ Programme.

- 4.10 As of period 7, the latest outturn of £124.4m for the AQ Programme is showing that the programme will be £8.0m below our Financial Authority for this year, primarily due to delays on the decision making for the back-office system on ULEX; forecasting accuracy on the taxi delicensing and the Van and Minibus Scrappage Scheme and value engineering savings across the programme of projects to offset cost pressures within the AQ Programme.
- 4.11 To date total savings of £16.8m have been identified in the AQ Programme, mainly from Bus Retrofit and the Air Quality Systems project which included process efficiencies and reductions in unit prices for cameras and in-station costs. This has enabled the AQ Programme to reduce EFCs in line with overall Financial Authority.

Key Project Achievements

- 4.12 The AQ Programme has been very successful in its delivery to date, and has achieved key milestones this year by introducing the central London ULEZ (April 2019), completing all 12 Low Emission Bus Zones (LEBZ) (Summer 2019), delivery of 90 upgraded Dial-a-Ride vehicles (March 2019), 200 Rapid Charging Points (August 2019) and the launch of the HGV Safety Permit application system (October 2019).
- 4.13 This section provides further detail on each scheme and a summary of the key financial and project delivery progress against targets is included in Appendix 1.

Air Quality Systems

ULEZ Central

- 4.14 ULEZ was successfully launched on 8 April 2019; motorcycles, cars, vans, minibuses, buses, coaches and heavy goods vehicles are now required to meet minimum emissions standards to travel in the same area as the Congestion Charge zone or pay a daily charge. The ULEZ operates 24/7 every day of the year, including weekends.
- 4.15 In the first six months of the scheme, up to September 2019, there was a large reduction in the number of older, more polluting, non-compliant vehicles detected in the zone: some 13,500 fewer on an average day, a reduction of 38 per cent in congestion charging hours.
- 4.16 In September 2019, the average compliance rate with the ULEZ standards was around 74 per cent in congestion charging hours and 77 per cent over a 24-hour period. A great increase from the 39 per cent recorded in February 2017 and the 61 per cent, just prior to launch, in March 2019 (congestion charging hours) (Details taken from the ULEZ- six month report).

- 4.17 As highlighted in Figure 3, trend analysis shows that, for the period July to September 2019, NO₂ concentrations at roadside locations in central London were on average 24 ug m⁻³ lower, equating to a reduction of 29 per cent, compared to a scenario where there was no ULEZ (See the red vs. blue trend lines shown in Figure 3).

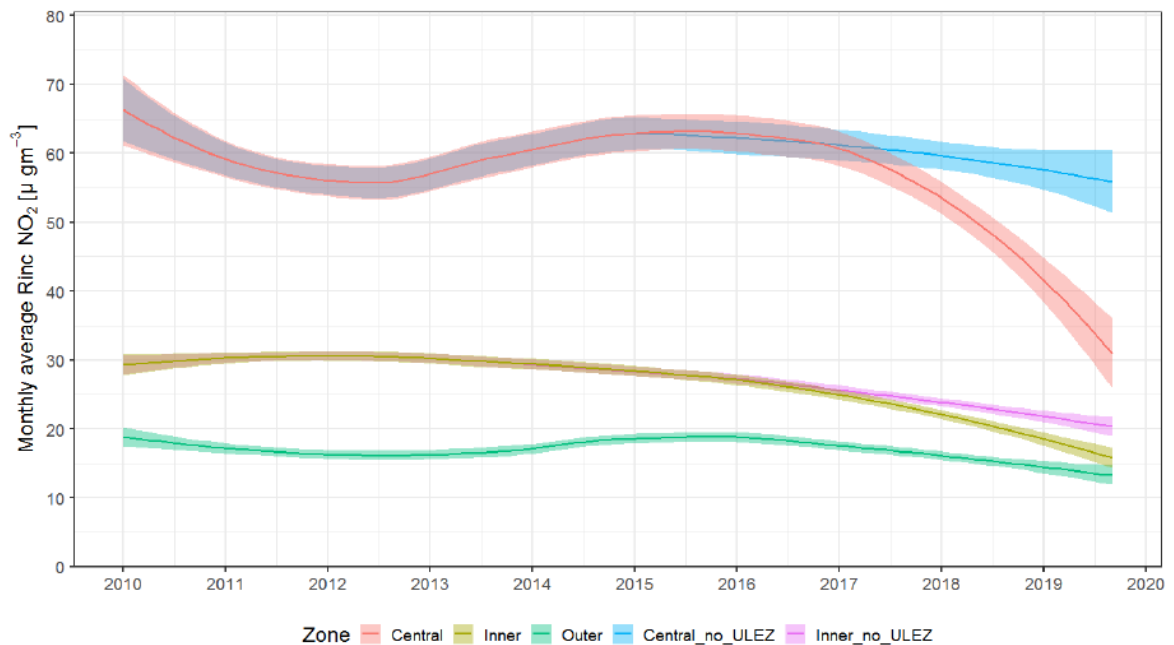


Figure 3: Monthly average NO₂ roadside increment by zone

- 4.18 Preliminary estimates indicate that after six months NO_x emissions from road transport in the central zone have reduced by 31 per cent (200 tonnes) compared to a scenario where there was no ULEZ. This is ahead of schedule to meet the 45 per cent NO_x emissions reduction expected in the first year.
- 4.19 Preliminary analysis of traffic flows indicate that the introduction of the central London ULEZ has contributed to a reduction in traffic flows in central London from May to September 2019 of between three to nine per cent when compared to 2018, though further analysis is needed to better understand long term complex changes in traffic flows as a result of ULEZ. Modelling produced before the ULEZ was launched predicted the scheme would reduce concentrations of NO₂ across London, with the greatest reductions in central London and more modest reductions in inner London. The trends shown in Figure 4 indicate this has been achieved successfully.

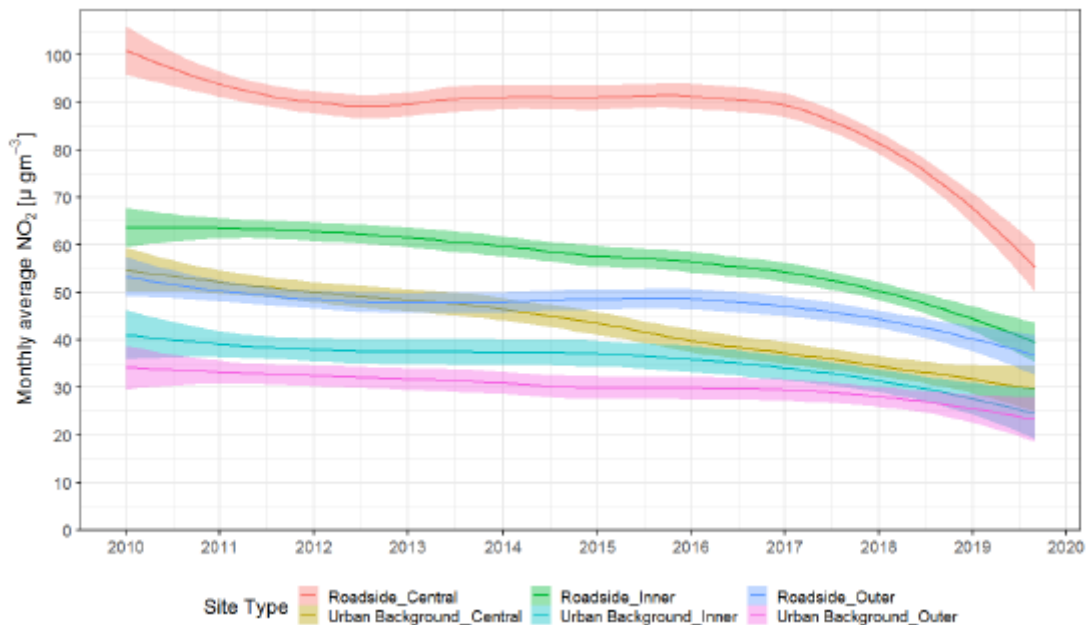


Figure 4: Monthly average NO₂ concentrations in London from 2010 to 2019

- 4.21 At central London roadside locations (top red line), an accelerated reduction in NO₂ begins in 2017, becoming a steeper downward curve from 2018 to September 2019. A similar, though less pronounced trend also occurs in inner London roadside locations (second from top green line). This is in line with when some vehicle owners began to prepare for the ULEZ and buses on routes in central London began to be upgraded to become ULEZ compliant.

ULEZ Expansion 2021

- 4.22 From 25 October 2021 the central London ULEZ boundary will be extended to create a single larger zone bounded by the North and South circular roads. Vehicles driving within the zone will be required to meet a minimum emissions standard to travel within the zone or pay a daily charge. The zone will operate 24/7 every day of the year including weekends.
- 4.23 Over the past year, we have been developing key work-streams to ensure a successful launch in 2021 including: design and installation of an extended camera network; design of back office systems to manage the expected volume of data captured by the cameras; installation of signage on the boundary and in the zone; traffic impact assessment and associated mitigation measures; and raising awareness through communication and marketing campaigns.
- 4.24 Traffic and camera levels have been modelled to assess impacts on traffic volumes around the boundary and to ensure an appropriate number of cameras are proposed. With the aim of both obtaining a credible capture rate and level of enforcement that facilitates behaviour change, yet also meeting our commitment under the General Data Protection Regulation, to use the ‘minimum number of cameras necessary’.

Low Emission Zone (LEZ) 2020

- 4.25 From 26 October 2020, the existing LEZ standards will be made tighter. The emissions standards for lorries, vans and other specialist heavy vehicles over 3.5 tonnes as well as for buses, minibuses and coaches over five tonnes will change from Euro IV to Euro VI. Owners of vehicles not meeting the tougher emissions standards will need to pay a daily charge to drive within the LEZ.
- 4.26 In order to ensure a successful launch, updates are needed to the existing website and business and enforcement operations systems; these process changes will be supported by a comprehensive communications campaign, which has been developed and approved by the GLA. Work is progressing on the development of the website update and the systems design.
- 4.27 A joint marketing campaign for both LEZ 2020 and the HGV Safety Permit Scheme was launched in October 2019 (see Figure 5) this was further supported by the successful launch on the 28 October 2019 of a joint vehicle registration checker, targeted at HGV drivers for both LEZ 2020 and the HGV Safety Permit Scheme.



Figure 5: LEZ and joint LEZ and DVS Marketing campaign posters

HGV Safety Permit Scheme (Direct Vision Standard (DVS))

- 4.28 The Mayor has committed to delivering a Vision Zero approach in London to make the streets safer for all. London has a particular problem with vulnerable road users and HGV collisions; which in turn discourages people from active travel and making improvements to air quality.
- 4.29 The Direct Vision Standard (DVS) assesses and rates how much a driver can see directly from their HGV cab in relation to other road users and assigns a star rating from 0 (poor) to 5 (excellent). Under the HGV Safety Permit scheme all HGVs over 12 tonnes will be required to hold a Safety Permit in order to operate in the Greater London area from October 2020. Those vehicles not meeting a minimum DVS star rating of one star (i.e. those that are zero star) will be required to fit additional safety

equipment to increase the vehicle's safety. Upon application, a HGV safety permit, recording the vehicle's star rating or safe system, is then issued.

- 4.30 The minimum DVS threshold will rise to three stars from October 2024 to ensure we continually improve the safety of HGVs coming into London. We believe this will reduce the risk of vulnerable road users not being seen by HGV drivers, leading to a reduction in the number of incidents where people are killed or seriously injured on our roads.
- 4.31 In January 2019, TfL obtained approval from the European Commission to implement the Permit Scheme Direct Vision Standard in London, confirming that TfL's London scheme was consistent with EU law including freedom of movement.
- 4.32 Between 8 January and 18 February 2019, TfL undertook a third round of public consultation, including proposals for the permit application process, safe system requirements, implementation and enforcement of the scheme; receiving 280 responses with 57 per cent of respondents strongly agreeing or agreeing with TfL's plans.
- 4.33 A final round of public consultation was held from 26 April to 23 May 2019 which set out TfL's final package in response to the previous feedback; a total of 25 responses to the consultation and statutory notice were received. This included consultation on statutory notice of a Traffic Regulation Order (TRO) to implement the scheme on a mandatory basis by London Councils TEC. A total of 25 responses to the consultation were received. They were overall in favour of the Scheme as presented. No objections were made to the TRO and so notice of making, confirming the scheme, was published on TEC's behalf at the end of August, without any subsequent legal challenge.
- 4.34 The permit application element, enabling operators to apply for an HGV Safety permit online, was successfully launched on 28 October 2019. This gives operators a full year to prepare and apply for a permit ahead of the October 2020 enforcement date.

Scrappage schemes

- 4.35 To support the launch of ULEZ Central and increase the likelihood of realising air quality benefits, the GLA announced the proposal to introduce two new scrappage schemes targeted at user groups found to be disproportionately impacted by the ULEZ criteria.
- 4.36 An additional £48.0m was made available to TfL to administer the grant schemes, through the support of Mayoral Delegation and Directions (reported to the Committee under the Use of Delegated Authority paper on 15 May 2019).
- 4.37 In February 2019, TfL launched the London wide £23.0m **Van and Minibus Scrappage Scheme**, targeted at micro businesses and charities who own non ULEZ compliant vans and minibuses.
- 4.38 In February 2019, the Mayor also announced that £25.0m would be made available for TfL to administer a targeted **ULEZ Car and Motorcycle Scrappage Scheme**. The aim of the scheme is to mitigate the adverse financial impact of the ULEZ on vulnerable groups; particularly those on certain means and non means tested

disability benefits living in Greater London. The scheme was launched on 23 October 2019.



Electric Vehicles

Rapid charge points

- 4.39 The Rapids project, funded by the Office of Low Emission Vehicles (OLEV), aims to deliver a network of rapid charge points (RCPs) in London to enable the electrification of the taxi and private hire fleets and encourage uptake of public and commercial ultra low emission vehicles.
- 4.40 In 2019, TfL has so far installed 61 new RCPs across London; enabling the project to achieve its milestone of installing 200 rapid chargers by 8 August 2019, two weeks ahead of target. As of 18 November 2019, there are 216 rapids currently live (143 for public use and 73 dedicated to taxis) as shown in Figure 6.
- 4.41 As part of our policy development, we have refined our delivery strategy to target: installation of taxi-dedicated sites on key-routes and in central London locations, open access sites in town centres and the introduction of rapid charging hubs.
- 4.42 To aid with the identification of suitable borough locations TfL, through London Councils TEC invited all boroughs, to submit a list of 20 potential sites for consideration for the installation of rapid charge points (TEC20). These sites have been filtered and screening has been completed for the remaining sites to be progressed towards the 300 RCP target by the end of 2020.

Legend

Rapid Charging Bays

-  TfL Open Use
-  TfL Open Use (Multi-Site)
-  TfL Taxi Only
-  TfL Taxi only (Multi-Site)
-  Existing (Non-TfL funded)
-  Existing (Multi-Site)
-  Progressing
-  Parked

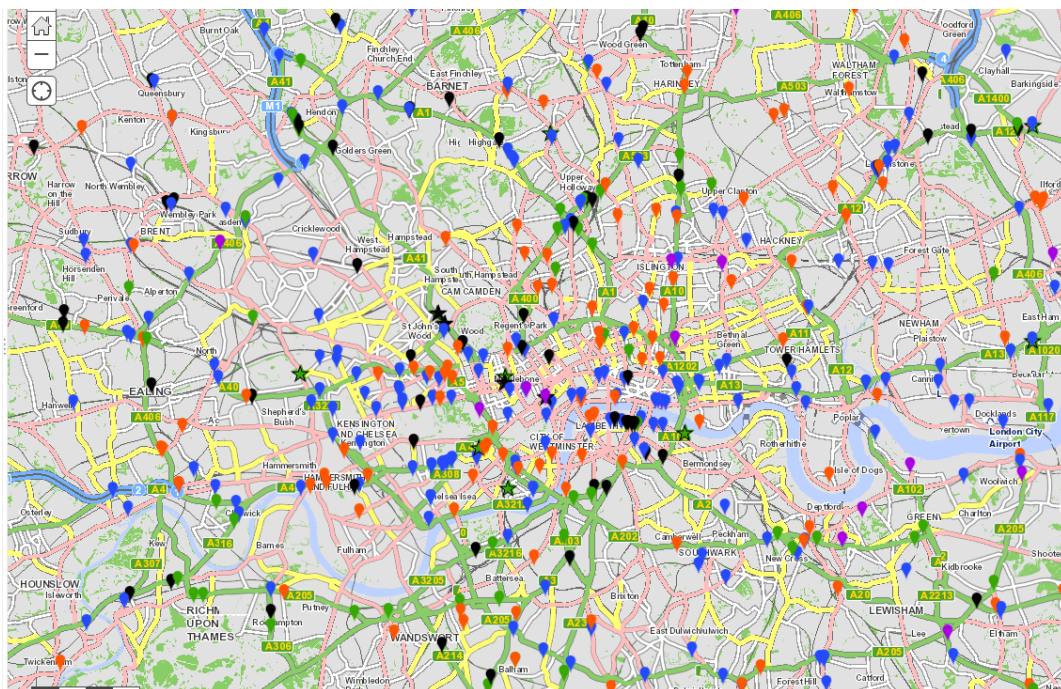


Figure 6: RCP Installations (as of November 2019)

Go Ultra Low City Scheme

- 4.43 The Go Ultra Low City Scheme (GULCS) is an OLEV funded joint programme between TfL, London Councils, the GLA and the London boroughs. The project is focused on increasing the provision of charge points in London under four work streams:
- (a) on-street residential charging;
 - (b) car club charging;
 - (c) Neighbourhoods of the Future (NoF); and
 - (d) a contribution to the rapid charging project.
- 4.44 Boroughs have made excellent progress in the delivery of on street infrastructure. The project's target of 1,150 residential charge points by the end of 2020 has already been exceeded. Over 1,500 charge points are already reported as delivered across the 23 London boroughs participating in the programme, with the majority of the remaining 200 charge points due to be delivered by 31 March 2020.
- 4.45 State aid limitations have meant that the car club work stream is only able to deliver a limited number of charge points; 17 car club charging points to date, another 44 are planned for delivery across seven boroughs (Wandsworth, Waltham Forest, Richmond upon Thames, Lambeth, Hackney, Ealing and Camden) by the end of 2020. In addition, funding has been invested in nine NoF schemes, locally based borough-led projects that test initiatives and policies to support the growth of clean vehicle in London. Progress in 2019 has included specialist training of EV mechanics, trials and leasing of EV vans and consultation on zero emission zones, freight consolidation and low emission streets proposals.
- 4.46 The GULCS project contributed £2.6m funding to TfL's RCP Infrastructure project, for which achievements have been described in paragraph 4.34.
- 4.47 In July 2019 the remaining £4.0m of GULCS funding was made available for London boroughs to bid for by 31 October 2019; with installation of the charging infrastructure by December 2020.

Dial-a-Ride Fleet Compliance

- 4.48 To improve our service and ensure ULEZ fleet compliance, we are upgrading our Dial-a-Ride fleet to new cleaner, safer and more fuel-efficient vehicles.
- 4.49 Dial-a-Ride currently operates a fleet of 320 vehicles. The replacement fleet will consist of a reduced number of 276 vehicles due to: increased efficiencies through the introduction of a new online booking and scheduling system, as well as increased reliability and reduced maintenance requirement of the new vehicles.
- 4.50 In 2018/19, 90 new ULEZ compliant Euro VI Dial-a-Ride vehicles were purchased and successfully in operation ahead of the launch of ULEZ Central in April 2019.
- 4.51 To ensure the whole fleet is ULEZ compliant prior to the launch of ULEZ Expansion in October 2021 a contract for the procurement of 166 Euro VI vehicles was awarded in August 2019. These vehicles are currently in production and proposed to be delivered and operational on a rolling basis over the next two years;

completing ahead of the ULEZ Expansion launch in October 2021. The first 15 vehicles from this second order were delivered in September 2019 (see Figure 7).



Figure 7: The new Dial-a-Ride fleet

- 4.52 We are currently undertaking a feasibility study on the proposal to trial operating an electric fleet for the remaining 20 vehicles to complete the fleet renewal programme. This option would not only ensure compliance with ULEZ Expansion and continuity of a safe and reliable service to its customers, but also allows the business to test the market, specification, reliability and operability of EVs in the Dial a Ride context; with the view to potentially introducing a wholly EV fleet in line with London's aspiration to run a zero-carbon network by 2050.

Taxi & Private Hire Vehicles

- 4.53 The taxi delicensing scheme was reviewed and relaunched in January 2019 with a tiered system of higher payments to encourage uptake. This proved successful in generating applications, with more than £17.0m paid out to around 2,000 taxi owners in the first eight months.
- 4.54 There have been more than 200 expressions of interest in the new LPG conversion scheme, which launched on 1 November 2019. Owners of Euro V diesel taxis can use this fund to get £5,000 towards the conversion of their taxi to LPG, which will then result in their vehicle having a fifteen year age limit.

Mayor's Air Quality Fund (MAQF)

- 4.55 The MAQF is a £22.0m, ten year fund which began in 2013 to support new projects by London boroughs to improve air quality. Owing to its success, this has been extended for an further two years until 2025 with the provision of an additional £4.0m funding. The second round of funding was awarded to support projects which ran between April 2016-2019, and was successful in delivering 22 projects, which included:
- (a) a Cross River Partnership/Clean Air Better Business II - a business-led action to reduce emissions and exposure to toxic air pollution;

- (b) Redbridge stars: An air quality education programme which engaged schools and supported pupils to lead on behaviour change activities, citizen science and campaigns (as shown in Figure 8);
- (c) delivery of Low Emission Neighbourhoods in areas in Hackney, City of London, City of Westminster and Greenwich; and
- (d) introduction of zero emission zones and networks in Hackney and Islington.



Figure 8: Redbridge Air action

4.56 Key delivery highlights for the MAQF project (excluding MAQF Business Fund Projects) are shown in Figure 9 below:



Figure 9: Key MAQF delivery highlights

4.57 In 2019, boroughs were invited to bid for the third round of MAQF funding. Sixteen projects, involving all 31 London Boroughs, and the Cities of London and Westminster, were successful in securing funding.

Buses

Bus Retrofit Programme

4.58 To date, over 3,400 buses (out of an estimated 4,200) have been retrofitted with improved exhaust systems to meet Euro VI emissions standards, including all Euro V New Routemaster buses.

4.59 Of these, over 2,000 buses have been retrofitted specifically for the Low Emission Bus Zones (LEBZ) and up to 500 buses for the central London ULEZ, with the remainder operating pan-London.

Low Emissions Bus Zones

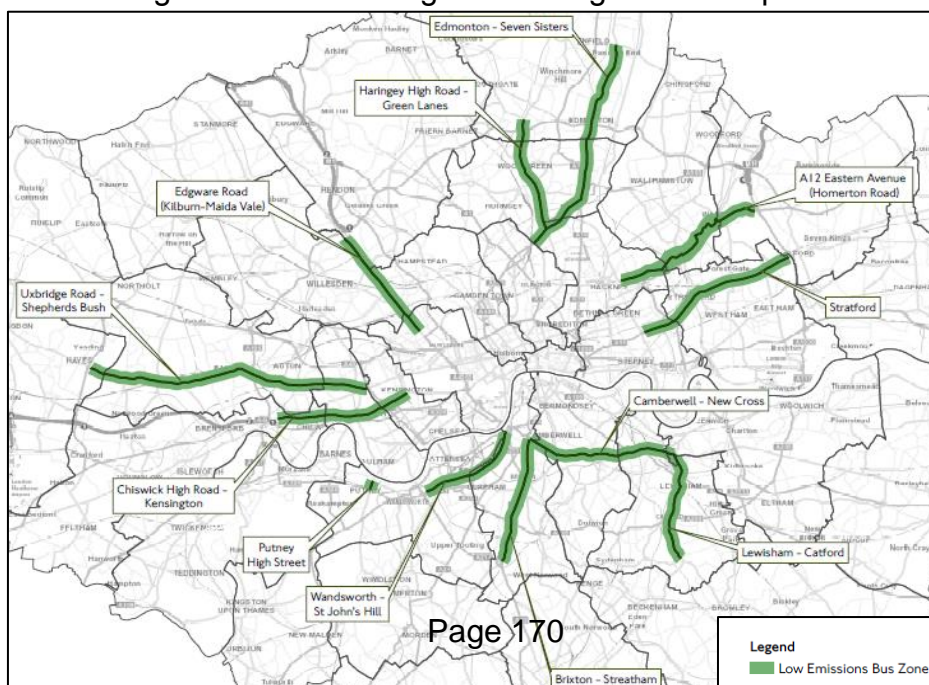
4.60 Since 2017, LEBZ have been introduced to tackle the worst pollution hotspots by prioritising cleaner buses on the higher emission corridors (see Figure 10) in advance of the entire fleet meeting the ULEZ standard by October 2020.

4.61 All 12 LEBZ were successfully delivered in summer 2019, approximately a year ahead of schedule.

4.62 In the past year, the remaining five zones were launched:

- (a) Edmonton to Seven Sisters;
- (b) Stratford;
- (c) Lewisham to Catford;
- (d) Chiswick High Road to Kensington; and
- (e) Uxbridge Road to Shepherds Bush.

4.63 All buses operating along these corridors now meet Euro VI emissions through the Retrofit Programme to meet Euro VI emissions standards, in addition to the delivery of new Euro VI buses. As a result of the zones, Londoners who were exposed to some of the highest levels of dangerous nitrogen dioxide pollution are now



benefiting from an average 90 per cent drop in bus-related NOx emissions.

Figure 10: 12 Low Emissions Bus Zones delivered

Hydrogen Bus

- 4.64 In May 2019 it was formally announced that we will be investing in 20 new hydrogen double decker buses and bus orders were placed. Pursuant to this TfL intends to invest £15.9m in the new buses and fuelling infrastructure for the JIVE project, whilst more than £5.8m of funding is also being provided by European bodies and £1.3m from the Office for Low Emission Vehicles.
- 4.65 However, the bus manufacturer WrightBus who were awarded the bus manufacturing contract has recently gone into administration. The business and factory have now been bought by the Bamford Bus Company and TfL is currently in negotiations with the new owners.

5 Key AQ Programme Deliverables in 2020

5.1 The proposed AQ delivery for 2020 is summarised in Table 3 below:

Project	Project & Programme Authority required for 2020 (£m)	Delivery in 2020
ULEZ Expansion 2021	56.6	<p>Complete site surveys and traffic modelling to progress through the design stage for signage, cameras and mitigation measures.</p> <p>Extensive publicity and stakeholder engagement to raise awareness and to promote the supporting scrappage schemes.</p>
LEZ 2020 and HGV Safety Permit Scheme	11.1	<p>Stakeholder engagement to raise awareness of the upcoming changes to standards.</p> <p>Enforcement is due to launch in October 2020 (i.e. Penalty Charge Notices (PCN) will begin to be issued from this date).</p>
Rapid Charge Points	4.9	<p>Work with London Boroughs to install rapid charge points to achieve the target of 300 by December 2020.</p> <p>Progress design stages and installation of a number of Rapid hub sites in 2020 to align to the Electric Vehicle Infrastructure Task Force Delivery Plan recommendations.</p>
Go Ultra Low City Scheme (GULCS)	1.6	<p>Work with London Councils and the GLA to support boroughs in delivering a further £4.0m worth of charging infrastructure (both residential slow chargers and rapids).</p> <p>Nine Neighbourhoods of the Future (NOF) schemes by 2020.</p>
Mayor's Air Quality Fund (MAQF)	3.0	<p>16 projects to be delivered between June 2019 and June 2022.</p> <p>Monitor and support London Boroughs in their delivery, and report on project benefits.</p>
ULEZ Supporting Van Scrappage Scheme	5.4	<p>Scrappage schemes launched to support small businesses, charities and low income households with the introduction and expansion of ULEZ.</p>
ULEZ Car and Motorcycle	13.0	<p>All scrappage payments made ahead of ULEZ Expansion</p>

Project	Project & Programme Authority required for 2020 (£m)	Delivery in 2020
Scrappage Scheme		launch October 2021.
Taxi delicensing	5.5	10,000 taxis delicensed (31 Dec 2020)
Taxi uptake grant (OLEV funded)	12.8	45 per cent reduction in diesel taxi related emissions (31 Dec 2020)
Bus retrofit	23.3	Retrofit an additional 1,000 buses with improved exhaust systems by December 2020, and upgrade mid-life buses to meet Euro VI emissions which will reduce airborne Nitrogen Oxide by up to 90% and Particulate Matter by 80% to positively improve air quality for all Londoners.
Dial-a-Ride fleet renewal	15.0	An additional 50 vehicles in operation by March 2020, with a total of 186 ULEZ compliant vehicles in operation by October 2021. Completion of feasibility stages for the trial of 20 electric Dial-a-Ride vehicles. The final 20 vehicles (electric or Euro VI) will need to be ordered by July 2020, in order to be operational ahead of the launch of the expanded ULEZ in October 2021.

Table 3: Key AQ deliverables for the next year

6 Challenges, Opportunities and Lessons learnt

Challenges and Opportunities

ULEZ Expansion 2021

- 6.1 Owing to the complexity and breadth of stakeholders that will be impacted by ULEX, a robust engagement, communications and marketing strategy is required. Discussions have commenced with the 15 London Boroughs along the boundary to understand key concerns and to ensure the required approvals and consents are gained in a timely manner. We are working closely with the London Boroughs within the expanded ULEZ to engage with residents and businesses and increase scheme awareness.
- 6.2 Additionally, public facing engagement will be required through a targeted marketing campaign to drive behaviour change across a vast area of London in the lead up to the ULEX go-Live date of October 2021.

- 6.3 To meet the go-Live date, TfL is fully reliant on the capability of Capita Business Services Limited and Siemens plc to deliver on the back-office system and implementation of a suitable camera network respectively; plus ensuring that the components work in conjunction with each other.
- 6.4 The proposed ULEX back-office solution involves a migration of the existing system to the cloud primarily to provide a cost effective solution to the significantly increased volumes expected from ULEX. As this is a new technology for TfL this will require recruitment of specialist technical resources and is a key delivery risk for this project.

Electric Vehicle Infrastructure

- 6.5 The Rapids, MAQF and GULCS projects are being delivered through or in partnership with boroughs. We will need to ensure sufficient support; guidance and technical information is available to enable successful delivery by the end of 2020. This information sharing and the parallel development of an EV coordination body/function (stemming from the GULCS project) provides the opportunity to provide the skills and experience to continue the development of London's growing EV infrastructure network beyond these time limited projects.

Hydrogen Buses

- 6.6 Our commitment through the JIVE project to invest in 20 hydrogen buses and the infrastructure to support them is under review as the contracted bus manufacturer WrightBus went into administration in September and have recently been bought by the Bamford Bus Company. We are in negotiations with the new owners and continue to work closely with the JIVE consortium to find the most suitable options for this project.

Lessons Learnt

- 6.7 The Integrated Assurance Review (IAR) at the time of the submission to the Committee in December 2018 produced a series of recommendations to improve the effectiveness of the Programme. Four of the previous actions have been closed out, the remaining recommendations are being addressed through alignment of decision and policy making as outlined below.
- 6.8 Utilising the lessons learnt from the 2018 IAR, we have reviewed our decision making and governance to reduce duplication and to ensure information flow allows for informed decision making (Figure 11).

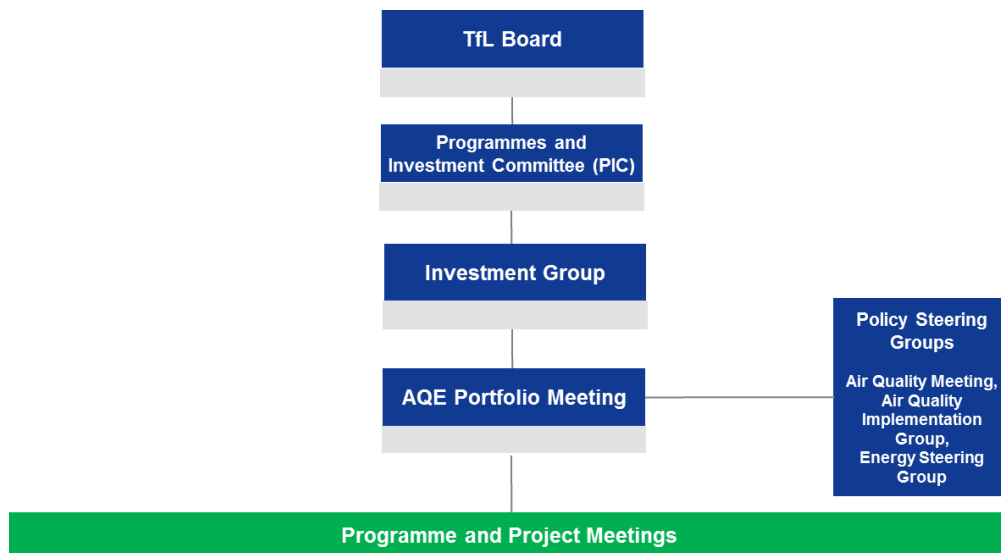


Figure 11: Air Quality Governance Structure

- 6.9 Programme governance will be managed in line with Standing Orders. The governance structure for the AQ Programme (Figure 10) includes a well-defined hierarchy of forums with consistent terms of reference, clear accountabilities and authorities, and coordinated meeting cycles. These forums will monitor and review delivery progress and either take or escalate decisions (for example on costs, risks, milestones, priorities and policies) as defined in their terms of reference.
- 6.10 The programme has seen significant cost increases from the original estimates on a number of projects; LEZ 2020 and DVS as covered in the AQ Programme submission to the Committee in October 2019. Short delivery timescales, resulting in consultation and policy development running in parallel with design and delivery, have meant reduced opportunities for savings.
- 6.11 We have reviewed lessons learnt from ULEZ Central to inform and improve our approach to stakeholder engagement, data analysis and sharing and communications and marketing, for the introduction of ULEX, LEZ 2020 and HGV Safety Permit Scheme.

7 MTS Outcomes, Key Performance Indicators and TfL scorecard

- 7.1 The 2019/20 TfL Scorecard provides a clear line of sight between the MTS and the Business Plan and how TfL monitors and drives performance (Appendix 2). Key scorecard indicators for AQ deliverables are:
- (a) Euro VI compliance of buses (Safety and Operations); and
 - (b) increase in sustainable mode share (Customer).
- 7.2 We are currently developing the programme level benefits management strategy which will enable proactive monitoring and tracking of benefits, ensuring all activities are aligned with strategic objectives, and updated within projects' business cases. We are working to develop the relevant measures and tracking mechanism for the schemes with the target of completing the strategy in early 2020.
- 7.3 The approach to benefits management at the project level will seek to align with the above scorecard indicators and the overall programme level benefits management

strategy, as such when a project delivers its benefits it will be possible to attribute the progress tracked on the scorecard to the activities within the AQ Programme.

- 7.4 All AQ projects are expected to track the realisation of measurable benefits, and to provide a full benefits report. The introduction of the central London ULEZ provides a key opportunity to undertake full benefits analysis for this project. Over the first six months of the scheme, measurements have been recorded on compliant vehicles detected in the zone, NO₂ concentrations at roadside locations and NO_x emissions from road transport in the central zone. At the end of the first year of operation, assessment against strategic objectives such as percentage NO_x emissions reduction will be measured.

Prioritisation

- 7.5 As part of the 2019 Business Planning round, an outcome-based approach was used to prioritise the projects on the basis of: those expected to achieve the greatest contribution to the MTS outcomes; committed contracts; requirements to meet legal air quality limits, in the context of significant pressure being placed on all TfL expenditure.
- 7.6 In this programme in particular, there is significant political interest and concern about improving air quality for the health of Londoners and to no longer be in breach of EU standards for air quality pollutants. Where individual business cases may at times show a smaller return on investment, sometimes due to the economic value, it may still be in the best interest of the Capital to proceed.
- 7.7 While the AQ Programme is a key part of the delivering the MTS, it is important to ensure a strategic awareness of the other areas that exist and, as such, as part of AQ scheme delivery, consideration should be given for opportunities to contribute to other MTS priorities.
- 7.8 This is carried out through benefits mapping, engaging with key stakeholders (including colleagues delivering the Healthy Streets programme) and scoring our projects using the TfL developed multi-criteria analysis tool (Strategic Appraisal Framework (SAF)). SAF takes into consideration other TfL criteria including Surface Outcomes, contribution to economic growth, sustainability, health, the common priorities used for TfL's business planning process, as well as other business planning strategies.
- 7.9 SAF also offers a consistent approach for users to demonstrate the strategic suitability of projects as they proceed through TfL's IAR process. The assessment involves completing a single input sheet to produce a consistent output; thereby eliminating the need for undertaking an assessment for each criterion. An example of SAF scoring is given in Appendix 3.
- 7.10 Where air quality benefits are achieved and realised via projects outside the AQ Programme, these will be identified and tracked accordingly.
- 7.11 The Energy and Carbon Strategy workstreams are embedded within other programmes to ensure that best practice is introduced across TfL.
- 7.12 As covered in the 'Power, Cooling and Energy' submission to the Committee in December 2019, initiatives to install solar panels and Light Emitting Diode (LED) lighting are also in progress on the TfL estate to reduce ongoing costs and carbon

emissions; increasing TfL's contribution of renewable energy generation to meet the Mayor's London Environment Strategy (LES). Solar panels and energy efficient lighting at the Croydon Tramlink depot are expected to be delivered in early 2020.

- 7.13 London Underground (LU) also spends £60m per year on cleaning stations, trains and tunnels. All vacuum extraction equipment have been fitted with specialised HEPA (high-efficiency particulate air) filters to trap smaller particles, which improves air quality. To better understand the impact of tunnel cleaning, a 'light surface' clean (using a vacuum on a trolley), was carried out on the Piccadilly Line between Barons Court and Earls Court (June 2019). This location was selected because it is not influenced by train movement/piston effect from other Lines. The trial proved to be successful and showed a 73% reduction in respirable dust. Following this, a further trial is currently underway on the Bakerloo Line Deep Tunnel Sections, combining the hoovering methodology and a suppressant application to encapsulate dust. This is due to be completed by mid-January 2020 and a full evaluation of the outcome will be undertaken. Added to this, LU have undertaken deep cleaning of the dustiest station platforms and 50m either side of each, resulting in an average 19% reduction in respirable dust. These are immediate improvements from trials. A round of routine monitoring will take place over the whole network from February 2020, which will give a picture of the average respirable dust levels on LU.
- 7.14 TfL has responded to the Heathrow expansion consultation and highlighted our significant concerns with the surface access strategy for an expanded airport. Our analysis indicates that without significant improvements in public transport capacity (e.g. the full Piccadilly line upgrade) and connectivity (e.g. the provision of new links on the National Rail network to Heathrow from areas of high demand) that it will attract a significant increase in vehicle trips on a network that is already heavily congested. This will adversely affect air quality in an area that already exceeds legal limits. We will continue to make the case for a credible surface access strategy in the run up to the submission of the DCO application and at the subsequent Examination in Public.
- 7.15 In addition to the work being carried out in London, TfL is already playing a key role in sharing the lessons learnt from London with other cities that are developing similar schemes. TfL officers are interfacing with those delivering the Birmingham Clean Air Zone (CAZ) in 2020 which focusses on NO₂ with positive impacts for Particulate Matter through charging vehicles 24 hours a day.

8 Legal and Equalities Impacts

- 8.1 The AQ Programme will be delivered in accordance with the Equality Act 2010. Equality Impact Assessments are considered on all strategies, policies, business plans, change programmes or projects, having regard to our obligations under the public sector equality duty in section 149 throughout the delivery of the AQ Programme. Possible effects on people with protected characteristics under the Equality Act 2010 (such as age, race, sex and often of particular relevance, disability) and mitigations of and countervailing considerations in respect of any adverse effects, will be considered and recorded.
- 8.2 An Equality Impact Assessment (EqIA) or Integrated Impact Assessment (IIA) has been undertaken for each scheme and impacts (positive and negative) on people with protected characteristics under the Equality Act 2010 have been identified.

(Refer to Background Papers). TfL will continue to have due regard to the matters set out in the Equality Act 2010 and the EqIA and IIA as the project progresses and will mitigate adverse effects to the extent that it is possible and reasonable to do so. Consideration will also be given to the requirement under the Equality Act 2010 to advance equality of opportunity and fostering good relations between people who share a relevant protected characteristic and people who do not.

- 8.3 The measures proposed in this report for inclusion in the AQ Programme are consistent with the Mayor's and TfL's duty to bring about compliance with legal limit values for pollutants (NO₂ in particular) as soon as possible and in the manner most likely to achieve that objective. The changes to the ULEZ (commencement in central London in 2019, expansion of emission standards London-wide for heavy vehicles by 2020 and to Inner London for all vehicles by 2021) have now been confirmed. TfL is under a duty to deliver them under the Greater London Low Emission Zone Charging Order 2006 (as amended) and the consultation proposals unless varied by the Mayor. TfL must also take appropriate action to reduce casualties from road traffic accidents and has developed the HGV Safety Permit Scheme for that purpose.

Privacy and General Data Protection Regulation (GDPR)

- 8.4 All relevant public bodies (including TfL) are under a legal duty to protect personal information and to ensure compliance with the General Data Protection Regulation (GDPR) and associated data protection legislation. A range of robust policies, processes and technical measures are in place to control and safeguard access to, and use of, personal information associated with all the Road User Charging schemes. Full details of how personal data is handled are made available on TfL's privacy page (<https://tfl.gov.uk/corporate/privacy-and-cookies/road-user-charging>).
- 8.5 TfL is now undertaking a Data Protection Impact Assessment for ULEX, DVS and LEZ 2020 which we expect to be ready for publication in early 2020. The DPIA will help to ensure operational decisions made on the locations and numbers of additional cameras that may be installed for an expanded ULEZ, take account of privacy and data security concerns - and identify mitigations for any privacy and data security risks. The DPIA will involve the Information Commissioner's Office (ICO) and the Metropolitan Police Service and include public consultation if the ICO advises to do so.

9 Financial Implications

9.1 The full scope of the Programme and Project Authority that is being requested, is set out in Table 4. The table has been structured to align with the work-streams, as described in Section 3: Air Quality Systems, Electric Vehicles, and Buses.

Activity Areas	Current Financial £m	Current PIC P&PA Authority £m	Additional Proposed P&PA Authority £m	Authority Request (£m)							
				2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2017/18 to 2023/24
Air Quality Systems	281	186	96	29	32	57	105	60	0	0	282
Bus	107	110	-1	6	21	35	28	13	5	0	109
Electric Vehicles	146	115	19	9	38	40	33	4	7	3	134
Value Engineering	-22	-2	-14	0	0	-7	-7	-2	0	0	-16
TOTAL	512.2	409.4	100.6	43.6	91.6	124.4	159.5	75.5	12.2	3.2	510.0

Table 4: Constituent activity areas and Programme and Project Authority requested from PIC (2019/20 – 2023/24)

9.2 Budgeted Programme and Project Authority of £100.6m is being requested to support the delivery of the AQ Programme comprising:

(a) Air Quality Systems (£96.0m): £93.0m for ULEX and £10.0m for LEZ which have been offset predominantly by approximately £4.5m efficiency savings that have been realised following the transfer of the Camera Refresh into the Programme; and £2.5m savings made on Congestion Charge Scheme Order Review and ULEZ Central;

(b) Electric Vehicles (£19m): £16.0m for ZEC Taxis, £2.0m for MAQF and £1.0m for ULEV Fleet roll-out which is still in the feasibility stage. There was an increase in the request for ZEC taxis as the GLA requested for the scope to be increased, however over-programming has been applied to account for the programme timescales slipping from lower trade engagement with the scheme than had been originally anticipated; and

(c) £14.0m of over-programming and £1.0m saving on Hydrogen Buses.

9.3 A summary of the latest financial position versus the 2019/20 Budget, plus the remaining years of the 2018 Business Plan and the requested Programme and Project Authority by year is shown in Table 5: AQ Costs and Funding Breakdown.

9.4 Whilst we have cumulative authority across the business plan years, the phasing in year has changed significantly from the 2018 business plan, causing pressures in 2020/21 and 2021/22, mainly through slippage of spend this year.

Cost and Funding Breakdown									
Air Quality Portfolio									
Gross Costs Rounded to £m	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	TOTAL	
Portfolio Total - Latest Outturn	44	92	131	167	80	15	6	533.2	
Over- programming and Value Engineering	0	0	-7	-7	-2	0	0	-15.7	
Financial Authority *	TfL element	44	79	194	112	62	13	9	512.2
	Third party funding	(6)	(10)	(21)	(14)	(4)	-	-	-55.9
Gross Surplus / (Shortfall) v BP 2018	-	(13)	70	(48)	(16)	(2)	4	-5.3	
Project Authority	Total Request	44	92	124	160	76	12	3	510.0
	Approved Authority	69	110	65	36	-	-		280.2
Approved since December PIC	ULEX			30					30.0
	Camera Refresh					12			11.9
	Scrappage			6	21	20	-	-	48.0
	Taxi Delicensing			18	6				24.0
	DVS		1	10	4				15.3
	New Request	(25)	(20)	(5)	92	43	12	3	100.6
Future Authority Requests		-	-	-	-	2	2	2	7.3

* Financial Authority consists of 2019 Budget and remaining years are the 2018 Business Plan

Table 5: AQ summary of costs and funding breakdown over the Business Plan Period

- 9.5 As shown in Table 5, Programme and Project Authority is higher in 2017/18-2019/20 than the programme total as the latter total reflects a change in the accounting treatment on SCR Bus Retrofit, which has been driven by only having on average three years contractual rights to SCR kit, although we expect them to be in the London fleet for an average of six years. This means costs are expensed across a longer period but the project will be delivered by 2020. See Appendix 4 for further summary of the 2018/19 project authority against the actual outturn.
- 9.6 In 2018, the Committee approved a total of £280.2m of Programme and Project Authority for the AQ Programme. Since that approval, four additional projects have been included in the AQ Programme with associated authorities; HGV Safety Permit Scheme (DVS), the Camera Refresh Project, Van and Minibus Scrappage Scheme, and ULEZ Car and Motorcycle Scrappage Scheme. A further £24.0m has also been included for Taxi Delicensing. The current total re-stated Project and Programme for Authority for the AQ Programme is £379.4m.
- 9.7 A further £30.0m of Programme and Project Authority was approved by the Committee in March 2019 for AQ projects providing a total of £409.4m
- 9.8 As highlighted in paragraph 4.10, total savings of £16.8m have been identified in the AQ Programme to date, going forward the over programming and value engineering targets are 4 per cent; reflecting that the AQ programme has limited

scope for slippage and the programme contains high risk innovative projects that TfL has not undertaken before.

- 9.9 In the event that the full value engineering savings are not realised, then 2020/21 priorities will be reviewed and relevant TfL officers will agree which projects are deferred, de-scoped or stopped.
- 9.10 In wider TfL plans for Air Quality programmes c.£800m investment has been referenced, includes operational spend that is outside of the remit of this programme. This value includes the cost of operating both ULEZ Central and LEZ 2020, as well as the inclusion of cost impacts for new vehicles and charging infrastructure in order to meet the MTS commitment of a zero emission bus fleet by 2037.

Operating costs

- 9.11 The AQ Programme proposal includes funding that is allocated to London boroughs to spend on AQ projects, through the MAQF and GULCS projects. In addition there are three funded schemes, which provide grants to the taxi owners and operators, small micro businesses and eligible owners of cars and motorcycles with diesel vehicles. These projects are recognised as operating costs, instead of capital expenditure, where they create an asset for the Borough rather than TfL.
- 9.12 Within the AQ Programme there are five projects classed under the vehicle compliance zone that once delivered will generate ongoing operating income and costs which will fund the implementation of the schemes and the compliance costs of Buses, Taxis and Dial-a-Ride vehicles as seen in Table 7 on the next page.
- 9.13 The level of investment spend by TfL in the business plan to improve air quality, is in excess of the net revenue generated from ULEZ. The central London scheme introduced in 2019, and proposed expansion of the scheme in 2021, will also contribute net revenue towards the operational expenditure including maintenance of the camera network and processing the PCNs to ensure the schemes are enforced to deliver behavioural changes and therefore air quality benefits.

	2019/20	2020/21	2021/22	2022/23	2023/24
Income	155	151	250	153	103
Operating Cost	(47)	(49)	(139)	(106)	(94)
Net Operating Surplus	108	102	112	47	9
Income streams:					
LEZ		15	10	7	7
ULEZ	155	129	222	129	80
DVS		7	18	17	17
Total	155	151	250	153	103

Table 7: Net Operational Income from new Air Quality schemes

10 Assurance

- 10.1 An IAR on the AQ Programme was carried out in November 2019 by the TfL Assurance Team. The objective of the IAR is to assess the AQ Programme's

readiness to deliver its outcomes. The IAR followed set lines of inquiry to answer whether the AQ Programme is sufficiently well managed for the Committee to award authority and delegated authority where appropriate. No critical issues were identified for this programme.

10.2 The Integrated Assurance Plan (IAP) was updated in November 2019 and sets out the reviews for the projects within the AQ Programme for the next 12 months.

List of appendices to this paper:

Appendix 1: Summary of AQ Outcomes between December 2018 – December 2019

Appendix 2: TfL Scorecard 2019/20

Appendix 3: Strategic Appraisal Framework (SAF)

Appendix 4: Analysis of AQE 2018/19 investment request compared to approved authority

List of Background Papers:

SSHHP – November 2019 paper on Air quality update and roadmap to zero emission

Camera strategy and GDPR compliance – 18 December 2019

Air Quality and Environment Procurement Authority Request – 23 October 2019

LU Power, Cooling and Energy Programme Update – 18 December 2019

Air Quality & Environment Programme 2018/19 Authority Submission – 11 December 2018

Paper on Air Quality Management submitted to the Committee on 15 May 2019

Paper on Air Quality Management submitted to the Committee on 6 March 2019

Paper on Surface Technology submitted to the Committee on 6 March 2019

Equality Impact Assessment for ULEX

Integrated Impact Assessment for ULEX

Equality Impact Assessment for LEZ 2020

Integrated Impact Assessment for DVS

ULEZ Car and Motorcycle Scrappage Scheme – Equalities Qualities Impact Assessment

ULEZ sixth month on report, GLA

www.london.gov.uk/sites/default/files/ulez_six_month_evaluation_report_final_oct.pdf

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Appendix 1: Summary of Key Financial and AQ Programme outputs since December 2019

Sub-programme	PIC 2018 (£m)	Description	Target (Date)	Progress to date (November 2019)
Rapids	17.5	Delivery of a network of rapid charge points in London to enable the electrification of the taxi and private hire fleets and wider uptake of commercial ultra low emission vehicles.	225 Rapid Charge Points (December 2019)	As of 18 November 2019, 216 Rapid Charge Points have been delivered
Go Ultra Low City Scheme (GULCS)	10.6	Delivery of residential on-street and car club charging infrastructure and local Neighbourhoods of the Future demonstration schemes to encourage a switch to ULEVs.	1,150 residential charge points by 2020. Nine Neighbourhoods of the Future (NOF) schemes by 2020.	Over 1,500 charge points are already reported as delivered across the 23 London boroughs participating in the programme, with the majority of the remaining 200 charge points due to be delivered by the end of the financial year.
Mayor's Air Quality Fund (MAQF)	9	A £20.0m fund over 10 years to support new projects by the London boroughs to improve air quality.	Multiple rounds of funding (2025).	Third round of funding was awarded in June 2019, and will run from June 2019-2022.
ULEZ Central 2019	49.4	From April 2019, the Ultra Low Emission Zone will require motorcycles, cars, vans, minibuses, buses, coaches and heavy goods vehicles to meet minimum emissions standards to travel in the Congestion Charge zone or pay a daily charge.	Confirmed by the Mayor Go live (8 April 2019)	Project launched on 8 April 2019. In September 2019 the average compliance rate was around 77 per cent over a 24-hour period.
ULEZ Expansion 2021	5.3	Expansion of the central London ULEZ to the North and South Circular Roads in 2021.	Confirmed by the Mayor (June 2018)	Progressing through the design stages- Traffic modelling has been completed, and signage and camera surveys are in progress.

Sub-programme	PIC 2018 (£m)	Description	Target (Date)	Progress to date (November 2019)
Van and Minibus Scrappage Scheme	0	Van and Minibus scrappage scheme launched in February 2019. Van scrappage, targeted at micro businesses and charities who own non ULEZ compliant vans and minibuses.	All £23.0m of scrappage payments made ahead of ULEZ Expansion.	£1.1m of the van scrappage total fund has been paid out to customers, with a further £1.2m (total £2.3m) of potential payments committed subject to customers submitting evidence of vehicle scrappage.
ULEZ Car and Motorcycle Scheme	0	ULEZ supporting car and motorcycle scrappage scheme targeted at those that may be disproportionality impacted due to income or disability.	All £25.0m of scrappage payments made ahead of ULEZ Expansion.	Launched 23 October 2019
LEZ 2020	6	Strengthening of the LEZ standards London wide for heavy vehicles including HGVs, lorries, vans, buses, coaches, minibuses and other specialist diesel vehicles.	Confirmed by the Mayor (June 2018)	Undertaking design work; marketing campaign and vehicle registration tracker has been launched.
Taxi delicensing LPG conversion	7	A voluntary delicensing scheme to encourage the removal of the oldest taxis from London licensing and purchase grants for new zero emission capable vehicles.	65% NOx reduction from taxis by 2025.	1,629 diesel taxis de-licensed (Aug 2019). Over 200 expressions of interest in new LPG conversion.
Taxi uptake grant (OLEV funded)	23.3			2,133 payments have been awarded against the purchase of ZEC taxis (August 2019). There are more than 2400 ZEC taxis licensed in London, accounting for more than 10 per cent of the fleet.

Sub-programme	PIC 2018 (£m)	Description	Target (Date)	Progress to date (November 2019)
Bus retrofit	83	Retrofit equipment fitted London buses to meet Euro VI emissions limits.	4,200 buses (December 2020)	3,400 buses.
Hydrogen bus	17	JIVE consortium funded initiative to procure 20 hydrogen buses and 2 re-fuelling stations in West London	Award the bus contract and the hydrogen re-fuelling station contract.	Contracts were awarded by Summer 2019; 20 hydrogen double decker buses have been ordered. However, the bus manufacturer Wrightbus who were awarded the bus contract went into administration in September 2019, and has recently been bought by a new owner; we will be meeting with them to understand their plans.
Low Emission Bus Zone (LEBZ)	4.9	Introducing cleaner buses on the highest polluting bus routes by 2020.	All 12 LEBZs delivered by 2020.	All 12 LEBZ were delivered in Summer 2019. All buses operating along these corridors now meet Euro VI emissions through a combination of retrofitting over 2,000 buses to meet Euro VI emissions standards and new buses contracted into the bus fleet.
Dial-a-ride fleet renewal	25	Upgrading of TfL fleet vehicles to ensure compliance with ULEZ.	Phase 1: 90 new vehicles for fleet ahead of ULEZ Central (April 2019) Phase 2a: 166 Euro VI vehicles ahead of ULEX (October 2021)	Phase 1: All 90 vehicles delivered by March 2019. Phase 2a: 15 vehicles delivered (Sept 2019)

*Total 2018/19 Financial Authority also included a value engineering target of £3m

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Appendix 2: TfL Scorecard 2019/20

	Long Term Objectives	2019/20 Scorecard Measure	2019/20 Target		
Mayor's Transport Strategy	Healthy streets and healthy people	Reduction in people killed and seriously injured on roads, from 2005-09 baseline	42.3%	Safety & Operations	
		London's streets will be safe and secure	Reduction in people killed and seriously injured on roads, from 2005-09 baseline (incidents involving buses)		58.7%
		London's streets will be clean and green	The number of London buses which are Euro VI compliant or better		8,350
		London's streets will be used more efficiently and have less traffic on them	Traffic signal changes to support Healthy Streets		15,000 person hours per day
		London's streets will be healthy and more Londoners will travel actively	Healthy Streets Check for Designers		Average 10 percentage point uplift
	A good public transport experience	Public transport will be safe, affordable and accessible to all	Reduction in customers and workforce killed and seriously injured		56 fewer people killed or seriously injured (2.5% reduction)
			Additional time to make step-free journeys		8.3 minutes
		Journeys by public transport will be pleasant, fast and reliable	Tube excess journey time		2018/19 year end actual
			Weighted bus customer journey time		33.5 minutes
			Percentage of Londoners who agree we care about our customers		50%
The public transport network will meet the needs of a growing London	Deliver key investment milestones	90%			
	Key Elizabeth line milestone	To be confirmed			
New homes and jobs	Transport investment will unlock the delivery of new homes and jobs	The cumulative percentage of affordable homes on TfL land with planning applications submitted (post May 2016)	50%	Customer	
Mode Share	80% of trips will be made by active, efficient and sustainable modes by 2041	Public transport trips (millions) Average kilometres cycled per day – central London (thousands)	3,967 540		
Corporate	People	Workforce representativeness – all staff	1.0%	People	
		Workforce representativeness – director / band 5	0.5%		
		A capable and engaged workforce representative of London	(improvement on 2018/19)		
	Inclusion index	46%			
	Total engagement	57%			
Financial	We cover our costs and we are prudent	Net operating surplus / (deficit)	Budget	Financial	
		Investment programme	Budget		

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Appendix 3: Strategic Appraisal Framework example (SAF)

AREA OUTCOME SCORING	Transport Outcomes		Score	Importance Description	V Low	Low	Medium	High	V High
	Active	Active travel, current & potential cycling & walking levels	+V Low	Min. localised incentives to Active travel	█				
	Safe	Road casualties & crime levels	None	Neutral impact on Safety					
	Green	Air Quality	+ High	Widespread reduction in emissions	█	█	█	█	
	Space Efficient	Freight flow levels & car dependency	+ Low	Improvement to road space use	█	█			
	Connected Public Transport	Improved connectivity	None	Neutral impact on PT Connectivity					
	Accessible Public Transport	Access Inequality	None	Neutral impact on PT Inclusivity					
	Quality Public Transport	Bus performance, demand and provision	+V Low	Comfort improvement	█				
	Sustainable	Car dependency & poor connectivity	None	Neutral impact on Sustainable travel					
	Unlocking	Forecast popn. And employment growth	None	Neutral impact on Sustainable Growth					

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Appendix 4: Analysis of AQE 2018/19 investment request compared to approved Project Authority

£m	Authority request: 2018/19 investment	Savings	Scheduling	Transfers	18/19 Outturn	19/20 Budget
Air Quality Systems	35	-1	-2		32	98
Bus	49	-2	-27		21	34
Electric Vehicles	26		14		38	61
Total	109	-3	-15	0	92	193

*Bus scheduling £27m mainly driven by underspend against the SCR Retrofit programme, due to a change in accounting treatment, which prepays operating expenditure costs over a 3 year period rather than recognising when spent.

*Electric Vehicles £14m overspend mainly driven by the acceleration in costs for the enhanced Taxi Delicensing scheme which generated significant demand and enabled us to recognise additional cost in 2018/19

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Date: 18 December 2019

Item: **Emergency Services Network, 4G Pilot and
Telecommunications Commercialisation Projects**

This paper will be considered in public

1 Summary

1.1 The purpose of this paper is to:

- (a) provide an update on the progress of the Home Office funded Emergency Service Network (ESN) project, the ESN work we expect to undertake during 2020/21 and the alignment of the ESN project with TfL's Telecommunications Commercialisation Project (TCP);
- (b) provide an update on the TCP, which aims to establish a long-term concession to develop new commercial telecommunications services including, but not limited to, Public Cellular Network (PCN) services on the Underground;
- (c) provide an update on the progress of the PCN Pilot and related enabling works to accelerate the subsequent delivery of PCN services by the TCP Concessionaire; and
- (d) request the necessary additional Financial Authorities and Programme and Project Authorities to deliver further ESN and PCN works, including a second phase to the PCN Pilot.

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 paper and the supplemental information on Part 2 of the agenda and, subject to Financial Authority being granted following approval of the Business Plan, to approve 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.**

3 Background

Emergency Service Network

- 3.1 The Government created the national Emergency Services Mobile Communications Programme (ESMCP) to replace the Airwave service (used by the UK emergency services) with an alternative solution based on a commercial 4G network provided by EE. We have been working with the ESMCP since 2015 to extend the ESN service into the below ground areas of our estate through the implementation of new 4G infrastructure (that can also support PCN services). Following a programme review in 2018, the Home Office revised its ESMCP delivery schedule and extended the Airwave service until the end of 2022 (with the option to further extend to the end of 2024).
- 3.2 On 6 March 2019, we updated the Committee on the progress of the ESN project and obtained approval for an extension of the existing ESN Phase 1 installation works through 2019/20, subject to full grant funding from the Home Office. Following the Committee's approval, we agreed a grant agreement adjustment with the Home Office for full additional funding for the works.

PCN Pilot and Enabling Works

- 3.3 On 6 March 2019, the Committee approved an expansion of our planned pilot of PCN services, which now covers the eastern section of the Jubilee line and involves all four UK mobile operators. The PCN pilot is intended to operate for a minimum of 12 months from March 2020.
- 3.4 In addition, the Committee also approved the installation of additional enabling infrastructure to support the subsequent acceleration of commercial mobile services on the Underground. These works included a second leaky feeder cable on the Jubilee and Victoria lines as well as additional station works of a similar scope to those being undertaken under the ESN project.

Telecommunications Commercialisation Project and ESN alignment

- 3.5 In his Transport Strategy published in June 2017, the Mayor committed to improve connectivity and customer service across the network by ensuring better access to public-sector property for digital infrastructure and by providing mobile phone access in the Underground. In support of this proposal, we are in the process of procuring a 20-year concession to leverage our asset base to create new commercial telecoms services in London and deliver additional revenues for TfL. These services include the delivery of PCN services on the Underground.
- 3.6 In late 2018, we started a joint analysis with the Home Office of the benefits to both parties from alignment of the ESN and TCP projects. For TfL, the key benefit of alignment is that we preserve our ability to realise our commercial telecoms ambitions on the current timelines we have set (and our associated ability to deliver on the Mayoral commitment to PCN services), while at the same time maintaining an overall ESN delivery schedule that is consistent with the Home Office's objective of retiring the Airwave service by the end of 2022. For the Home Office, an aligned delivery approach offers the potential for cost savings.

4 Activity since March 2019

Emergency Service Network and PCN Enabling works

- 4.1 As of November 2019, the extended ESN Phase 1 project has installed 325km of fibre optic cable and 370km of leaky feeder (of which 170km has been fixed into its final position) in the 421km of in-scope tunnels. By 31 March 2020 we expect to have pulled the remaining leaky feeder into a temporary position, fixed 265km of leaky feeder into its final position, and installed all of the fibre. Cabling works at the first 43 stations has been completed and work is on-going at the next 11 stations of the 127 stations in scope. Design work is also underway for the Elizabeth line and Northern line extension stations and will complete by 31 March 2020.
- 4.2 A second leaky feeder (required for future PCN services) has been installed in the eastern section of the Jubilee line and work will start on extending this into the western section of the line in January 2020. A second leaky feeder has been pulled into the Victoria line and is currently being fixed into its final position.
- 4.3 We have also continued to trial the overall 4G infrastructure, as part of which Emergency Services users have been able to make 4G calls and browse the web using their new ESN devices on platforms and in trains on a discrete section of the Jubilee line during operational hours.

PCN Pilot

- 4.4 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 has been completed which covers all stations, platforms and tunnels between Westminster and the portal before Canning Town station. Installation works are underway in all platforms, station areas and tunnel sections (excluding London Bridge and Waterloo station areas, which may form part of the second phase of the PCN Pilot), as well as the rooms in Canada Water station that will house the mobile operators' equipment.
- 4.5 Currently, we are working closely with all four mobile network operators to design and install their equipment and connectivity at Canada Water. Three of the four operators have signed the terms and conditions for the PCN Pilot and discussions continue with the fourth and final operator.

5 TCP Progress and Alignment with ESN Project

- 5.1 We released the Invitation to Participate in Dialogue (ITPD) in June 2019 to the four shortlisted tenderers. Responses were received from three of the tenderers and these were evaluated prior to starting the dialogue process in November. We have elected not to undertake a down-select, so all three tenderers are participating in dialogue.
- 5.2 In July 2019 we reached agreement with the Home Office to formally align the ESN project with the TCP. Key elements of existing ESN scope have been included as mandatory priced options in the TCP ITPD and will be evaluated as part of the overall procurement. On 31 October 2019, we held the first of three planned review meetings with the ESMCP's Senior Responsible Officer to assess the results of the initial bid evaluation process. At this meeting, the Home Office agreed to continue with the aligned approach through dialogue to the next checkpoint in January 2020.

- 5.3 The Home Office is being included in key stages of the project. It provided requirements for installation and on-going service elements and provided evaluation reports for the responses to the ITPD. The Home Office is also involved in key dialogue sessions for financial and technical areas pertinent to ESN.

6 Delivery in 2020/21 and 2021/22

Emergency Service Network

- 6.1 We have agreed in principle with the Home Office that a further increment of enabling installation work is required to be brought forward into the current ESN Phase 1 scope. This will complete the fixing into final position of the remaining 155km leaky feeder cable, which is currently (or will be) installed in a temporary position, and complete ESN station cabling works required in a further 20 stations. The Home Office has agreed to this scope and has committed funding in principle.

Telecommunications Commercialisation Project

- 6.2 Dialogue is progressing with the three tenderers and is scheduled to complete by February 2020. We are including the Home Office in the dialogue sessions relevant to ESN. Following dialogue, our tender documentation will be updated and the Invitation to Submit Final Tender (ISFT) will be issued in February 2020.
- 6.3 Tenders will be submitted in March and evaluation is due to complete in April 2020. At this point the preferred tenderer will be selected using the scoring criteria set out in the ISFT. The award criteria use the most economically advantageous tender principle, with a combination of technical, commercial, financial, health, safety and environmental, and responsible procurement criteria.
- 6.4 The award of a concession that includes ESN services will be dependent on a Home Office commitment to fund the whole life project costs for these services.

PCN Pilot and Enabling Works

- 6.5 Subject to the Committee's approval and the successful launch of the PCN pilot in March 2020, we plan to extend the PCN pilot's geographic coverage through a second phase of installation works on the Jubilee line.
- 6.6 In addition, subject to the Committee's approval, we plan to complete further enabling cabling works in tunnels and stations during 2020/21 and 2021/22. This work will reduce the period between appointment of the concessionaire and the subsequent start of a production PCN service.

List of Appendices:

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

List of Background Papers:

None

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Programmes and Investment Committee



Date: 18 December 2019

Item: Barking Riverside Extension Update

This paper will be considered in public

1 Summary

- 1.1 The purpose of this paper is to update the Committee on progress and issues associated with the project. In December 2018, under authority delegated by the Committee, the Chair of the Committee granted the authorities enabling the award of the main works contract (MWC) for the Barking Riverside Extension (BRE) to Morgan Sindall and Volker Fitzpatrick acting as a joint venture (JV).
- 1.2 The JV mobilised in early 2019 and construction commenced in line with the programme. This allowed the completion of a significant milestone in summer 2019: a 16-day Network Rail blockade, taking over the mainline Network Rail infrastructure – with the minimal possible disruption.
- 1.3 The major challenge that the BRE team is facing is the discovery and required diversion of previously unidentified buried utility services. The quantity of diversions and the length of time it will take to divert them, or to redesign the BRE infrastructure to avoid a conflict, are putting considerable pressure on the programme.
- 1.4 A paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from this meeting.

2 Recommendation

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

3 Background

- 3.1 Barking Riverside is the largest brownfield development site in east London, located in the London Borough of Barking and Dagenham, with planning permission for 10,800 new homes. To unlock the full scale of the development, planning permission for the site was granted on the basis of significant investment in transport infrastructure.
- 3.2 An extension of the electrified London Overground (LO) Gospel Oak to Barking line is being constructed, from its current terminus at Barking to a new station in Barking Riverside. It will be over 4km in length including 1.5km of new track. Four new LO trains per hour will operate from Barking station along the existing Tilbury

Loop line and then via a new section of railway, heading south towards Barking Riverside.

- 3.3 Figure 1 below shows the plan of the new line which will reach right into the heart of the Barking Riverside development.



Figure 1: Barking Riverside and new line & station

- 3.4 The BRE scheme is referenced in the Mayor’s Transport Strategy and the development itself is in line with the Mayor’s Healthy Streets approach and will contribute to 80 per cent of trips by cycling, walking or public transport. The Barking Riverside Masterplan Framework Travel Plan (2016) sets an interim sustainable mode share target of 75 per cent by 2031. Examples of how they intend to achieve this are:

- (a) fully segregated cycle lanes (both sides of the road);
- (b) cycle Hub at the Barking Riverside Station;
- (c) only 0.7 car parking spaces per household on the estate; and
- (d) more than a third of the homes (4,000 units) cannot be occupied before the station is operational – Barking Riverside Limited, the developer of the brownfield site, currently forecasts they will reach this level of occupation in 2023.

A recent aerial view of the development taking shape can be seen in Figure 2.



Fig 2: Barking Riverside Development September 2019 – rail corridor taking shape

4 Project Progress

- 4.1 The JV mobilised in early 2019 and construction commenced in line with the programme. As noted at paragraph 1.2 above a 16-day Network Rail blockade was completed in summer 2019, taking over the mainline Network Rail infrastructure with the minimal possible disruption. To allow the rail systems delivery – including track and signalling changes – and the blockade to proceed, ‘Network Change’ was secured from Network Rail in July 2019 after being agreed with external stakeholders (in line with the Office of Rail and Road’s Network Code).
- 4.2 The blockade work included construction of a new ramp, piling for a new pier that will support the viaduct to the new Barking Riverside station, along with signalling and telecommunications work needed to keep trains a safe distance apart on the new tracks. To maximise Network Rail infrastructure possession time, work was carried out around the clock meaning over 330 hours of consecutive work was completed during the blockade.
- 4.3 Importantly, up to the end of November 2019, over 500,000 hours of work has been carried out without a RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013) incident. In addition, the station site and one of the materials compounds have recently been awarded Beacon Status for the innovative work undertaken by the JV on health, safety and environment. However, BRE has not achieved zero harm. There have been incidents where people have sustained minor injuries and property has been damaged. We are continually learning from incidents such as these to help prevent reoccurrences.

- 4.4 In addition to the rail modifications, viaduct piling and pier construction works have been progressing well on both the northern (Network Rail) site and southern viaduct (Barking Riverside Limited development). The first viaduct beams have now been installed and the station works are very visible, as can be seen in Figure 3.



Figure 3: Station Progress

- 4.5 From a stakeholder and community engagement perspective, the JV's Social Value team is now engaging regularly with local businesses, the community, Barking Riverside Limited (the developer) and TfL's Local Communities and Partnerships team.
- 4.6 Effective governance for BRE is in place internally between the Major Projects Directorate, Surface Transport and other TfL teams through a periodic client meeting, as well as between TfL and external stakeholders via a regular joint project meeting (and Barking Riverside Steering Group) and a series of meetings between TfL and the JV.

5 Project Challenges

- 5.1 Throughout the developer's (southern) section of the construction site, the major challenge being faced by the BRE team is:
- (a) the discovery of previously unidentified buried utility services;
 - (b) investigations into them; and
 - (c) the diversion or removal of conflict where required.
- 5.2 Several of the viaduct piers now have issues with these buried services and each one has a different action plan to resolution. At pier 15, the BRE team has worked hard to identify options to optimise the programme and is now twin-tracking either

redesigning the pier infrastructure or expediting the diversion of cables by BT / Virgin. More recently, at pier 14, a Thames Water pipe has been discovered that does not appear on any of its records. Since this discovery, the issue has been escalated with Thames Water with meetings being held on site, as well as weekly conference calls to develop the required mitigation solution. These buried services at both piers 14 and 15 have the potential to extend the JV's completion date and impact on the forecast opening date for the new station. Work is being undertaken to identify steps to further mitigate these issues and delays.

- 5.3 At the end of October 2019, 70 per cent of the piers had been piled. While the remaining piers have been scanned to 5m depth, there is still uncertainty around the discovery of further conflicts until all piling is complete in early 2020.
- 5.4 Away from buried utilities. there is a programme clash with Barking Power Limited's power station decommissioning activity. The City of London Corporation (CoL) which holds the majority (75 per cent) shareholding in Barking Power Limited (the owners of the power station) has plans to migrate and consolidate Billingsgate, New Spitalfields and Smithfield markets on to the site adjacent to the BRE. Prior to this consolidation, it has an obligation (by end of 2019) to remove power lines on and over the BRE construction site in order to fully decommission the old power station.
- 5.5 We have been working constructively with CoL to provide it access to the BRE site to remove its power lines while minimising the risk to the BRE programme and a satisfactory resolution is envisaged. Heads of terms have been agreed with Barking Power Limited, which seeks to enable the first stage of these works to take place over the Christmas period in 2019, when the JV is not on site.

6 Finance

- 6.1 Financial and Programme and Project Authority for the BRE was increased to £287m to reflect the revised Estimated Final Cost (EFC) in December 2018.
- 6.2 Forecast expenditure to date in 2019/20 and on the BRE as a whole is in line with the budget / Business Plan and a number of value engineering items are being progressed. Some of those items were committed within the EFC agreed at contract award, whilst others have been subsequently identified in 2019. Further information on this is provided in the paper on Part 2 of the agenda.
- 6.3 At the same time, the award of additional funding of £10m by the Greater London Authority (GLA) was agreed in principle to help fund this increase in EFC and allow the BRE to proceed. £172m of third-party funding is in place from the developer and final arrangements are being put in place for the additional £10m from the GLA (via the developer), which will make the total third party funding £182m. This is expected to be fully secured in December 2019 and is assumed in the 2019 Business Plan.

7 Delivery and Commercial Management

- 7.1 The 2019/20 Period 7 (P7) plan (summarised in Table 1) includes an assumed six-month delay for the utility diversions / redesign. Work is underway to determine whether further mitigations can reduce this impact. At this time, such a

delay is not expected to impact on the developers' programme, which requires the station to be operational before such time as 4,000 units are occupied.

Handover viaduct structure to commence slab track installation	Feb-21
Completion of track and viaduct works	Aug-21
Completion of Handover from Contractor	Nov-21
Operational Testing & Commissioning	Minimum 3 months

Table 1: P7 2019/20 Plan for BRE

- 7.2 The above programme includes a minimum three months of operational testing and commissioning before services can be introduced. The BRE team has already started investigating the detailed minimum requirements that need to be satisfied for this operational testing period and are considering what could be done in parallel to the final construction phases. A new project manager for Arriva Rail Limited (London Overground train operator) is being engaged to aid this process.
- 7.3 The short-term (2020/21) planned activity milestones can be seen in Table 2. The priority activities include the completion of viaduct construction works (north section) in November 2020. This area of construction has already suffered some delays due to obstructions / conflicting services being located and the development of a more robust methodology for piling between the High Speed One (HS1) tunnels in the area to satisfy stakeholder demands.

2020 Milestones for BRE	Target Date	Forecast Date
Commence North Viaduct Deck Construction Piers 1-14	27-Nov-19	17-Jan-20
Install Piles at Piers 30/31	20-Feb-20	20-Feb-20
Complete Overhead Line Installation on Existing Network	19-Jan-20	17-Mar-20
Complete Installation of switches and crossings within Ripple Lane Sidings (98hr Possession).	29-Dec-19	13-Apr-20
Completion of Construction Works North Viaduct	13-Jul-20	17-Nov-20
Complete Stage 15 Signalling Commissioning Works - (98 Hour Possession)	29-Dec-20	29-Dec-20

Table 2: Upcoming Milestones

8 Assurance

- 8.1 All recommendations of a review by the Independent Investment Programme Advisory Group (IIPAG) and Internal Assurance Review (IAR) in November 2018 have been satisfactorily closed.
- 8.2 Between October and November 2019 an interim IAR (including IIPAG) review was carried out. There were six recommendations made and accepted by the BRE team; of which none were deemed critical. The recommendations primarily focused on the management of the multiple third party dependencies on the project and development of a plan to ensure all regulatory approvals are in place in preparation for entry into service.

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 Report 2019

IAR Report 2019

Management Response to IA and IIPAG Reports 2019

Minutes of Programmes and Investment Committee, January 2019

Papers relating to the 11 October 2019 meeting of the Committee relating to the Barking Riverside Extension Project

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Programmes and Investment Committee



Date: 18 December 2019

Item: London Underground Power, Cooling and Energy 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) Power, Cooling and Energy (PCE) Programme (the Programme). This is the second 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;
 - (b) summarise planned delivery in 2020/21 – 2021/22; and
 - (c) assure the Committee on the progress of the Programme.
- 1.3 The paper requests approval for Programme and Project Authority of £1.3m (outturn including risk), bringing the total authority to 2024/25 to £84.2m. 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

LU R&E Power, Cooling and Energy Programme (PCE)*					
	Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
Power	96.7	90.8	54.3	1.3	55.6
Cooling	23.5	23.3	23.5	0.0	23.5
Energy	6.1	2.8	5.1	0.0	5.1
Total PCE	126.3	116.9	82.9	1.3	84.2

* Financials covering prior years up and including 2024/25.

2 Recommendation

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

3 Background

- 3.1 The operation of LU's train service is dependent upon a safe and resilient power network. The R&E PCE Programme safeguards this operation by delivering interventions aimed at legislative compliance and maintaining and improving the safety and reliability of the power assets.
- 3.2 The Programme supports the Mayor's Transport Strategy objective of 'providing a good public transport experience'. It contributes to the Mayors' London Environment Strategy, zero emissions across the London transport network by 2050, and a zero carbon TfL rail service by 2030. The Programme also supports LU's priorities for 'Safety and Reliability' and 'Affordability'.
- 3.3 Investment in PCE assets is managed in accordance with delivering these priorities. This has been achieved by undertaking systematic asset renewals based on annual condition assessments, prioritised through value management to balance affordability, safety and reliability. Additionally, in recent years, asset replacements have been delivered during power enhancement works associated with the LU Railway Systems Enhancement (RSE) Programme and the Four Lines Modernisation (4LM) Programme.
- 3.4 As the biggest consumer of electricity in London, LU has a responsibility to reduce the cost and environmental impact of this consumption. This Programme aims to deliver a cooler and more efficient network by enhancing ventilation equipment and introducing alternative energy systems, reducing carbon emissions and contributing towards the Mayor's vision for an environmentally friendly London.

4 Delivery since July 2018 Submission to the Committee

Power Projects

- 4.1 **Power Asset Renewals Work Bank.** Since July 2018, 11 power projects have been delivered. Their delivery has improved safety, legislative compliance and reliability in areas such as cabling, high voltage plant, substation property and Greenwich (Power) Generating station. Key deliverables included:
- (a) replacement of the first (of six) gas turbine control system at Greenwich Generating station, ensuring the continued availability of emergency back-up power to the LU network;
 - (b) replacement of 5km of High Voltage cabling and 3km of lead covered DC (direct current) cabling;

- (c) upgrade of substation earthing systems to comply with LU standards;
 - (d) replacement of two 22kV switchboards on the Central line reducing the risk of failures on the line; and
 - (e) multiple Substation roofing overhauls to prevent water ingress.
- 4.2 Additionally, conceptual designs for a further 12 projects across the network have been completed, and these are in various stages of detailed design and delivery.
- 4.3 **Power SCADA Life extension.** This project is aimed at managing obsolescence risk and safeguards operation of traction power control systems across the LU network for at least ten years. Alignment with the wider Technology and Data strategy has been completed and the project has progressed into concept design prior to contract award. A further £1.3m authority is sought due to prolonged contract negotiations impacting the cost phasing and higher than expected tender prices. Note: this is affordable within the 2019 Business Plan.
- 4.4 **Central line Resilience.** Installation of new transformer rectifiers has been completed. This has increased the power resilience of the line and made failures of the train service less likely. Final activities required for closure of the project are in progress.
- 4.5 **Northern and Jubilee lines Dual Power.** Installation of standby generators and construction of a new transformer room have been delivered. The project is in the final stages of close out.

Cooling Projects

- 4.6 **Existing Fan Asset Renewals.** Installation of a new fan at Bond Street has been completed. Feasibility studies for a new fan at Notting Hill Gate station have been concluded, allowing the project to progress to the design stage.

Energy Projects

- 4.7 **RE:FIT 2 Solar.** Feasibility assessment of a depot building at Acton found the structure to be economically unsuitable for solar panel installation. Following a review of alternative sites, Croydon Tramlink depot has been selected as the first site to progress. Two further sites, the Tunnelling and Underground Construction Academy (TUCA) at Ilford and Stratford Market Depot have also been identified to be taken forward to feasibility stage. These three sites aim to meet the Mayor's 1.1MWp (MegaWatt peak) target of solar generated power and reduce TfL's dependency on the National Grid for power. These are positive steps towards delivering the Mayor's target of a zero carbon rail service by 2030.

5 Programme Delivery in 2020/21

- 5.1 **Power Asset Renewals Work Bank.** Prioritised delivery of projects will continue to ensure assets comply with legislation and remain safe and reliable in operation. Key deliverables include commencing works to:

- (a) replace non-compliant power switching assets in depots and sidings;
- (b) improve the earthing arrangement between Putney Bridge and East Putney to bring this area compliant to standards;
- (c) continue the replacement of obsolete gas turbine control systems at Greenwich Generating station; and
- (d) replace high voltage switching equipment at Greenford substation.

To prepare for the next phase of asset renewals, several new items from the prioritised work bank will be progressed to concept design.

- 5.2 **Power SCADA.** Contract award will be completed, and new hardware and software will be procured. Factory acceptance testing of the system will be undertaken and is currently planned for late 2020, prior to installation in 2021.
- 5.3 **Existing Fan Asset Renewals.** Concept and detailed design will be completed for the Notting Hill Gate fan and site preparation works will commence. Design work will commence for replacement of the next fan at Shepherd's Bush station.
- 5.4 **RE:FIT 2 Solar.** Solar panels and energy efficient lighting at the Croydon Tramlink depot is expected to be delivered in early 2020. Subject to feasibility outcome, further installations will be completed at TUCA and Stratford Market depot providing solar generation capability of 1.1MWp or more.
- 5.5 The Power, Cooling and Energy Programme comprises of the projects outlined in Table 2 (all figures include risk and inflation). For Power SCADA, as per paragraph 4.3 above, the 2019 Business Plan contains the means to align Financial Authority with the total Programme and Project Authority (and the Estimated Final Cost).
- 5.6 In addition to this Programme, and funded elsewhere within TfL, the following should be recognised as contributing towards the Mayor's zero carbon target:
 - (a) a new LU train maintenance depot building at Acton is under construction and is due to complete in 2020. This building is being fitted with solar panels designed to generate 0.15MW of electricity and reduce the LU's carbon need by 58 tonnes per annum;
 - (b) feasibility studies are underway across 40 TfL sites to identify potential future opportunities for further solar panel installation;
 - (c) on London Overground, the Barking Riverside station (planned to open in late 2021) will have solar panels capable of generating up to 25kWp (KiloWatt peak) of electricity;
 - (d) the Docklands Light Railway (DLR) is planning to install solar panels on the Beckton depot roof in late 2022. Initial feasibility calculations suggest that up to 25-30kWp of solar generated power could be produced from the site; and
 - (e) in addition to delivering a waste heat scheme at City Road / Bunhill (near Old Street, London), feasibility studies into further waste heat utilisation are due to complete in 2020. Delivery of the outcome from these studies aim to facilitate de-carbonisation of heat in London at up to six locations.

Table 2 – PCE Programme cost summary (£m) to 2024/25

	Description	Financial Authority	Estimated Final Cost (EFC)	Existing Programme and Project Authority	This Authority Request	Total Authority	Future Requests
Power	Power Asset Renewals Work Bank: Programme of power renewals to comply with legislation (e.g. Electricity at Work Regulations 1989) and maintain safe and reliable operation.	82.2	75.1	39.9	-	39.9	35.2
	SCADA: Life extension intervention to mitigate against equipment obsolescence and prolong maintainability.	14.5	15.7	14.4	1.3	15.7	-
	Total power	96.7	90.8	54.3	1.3	55.6	35.2
Cooling	Existing Fan Asset Renewals: Programme of asset renewals targeting the most degraded condition fans to maintain cooling and ventilation capability.	23.5	23.3	23.5	-	23.5	-
	Total Cooling:	23.5	23.3	23.5	-	23.5	-
Energy	RE:FIT 2 Solar: Installation of solar panels on TfL rooftops to contribute to the Mayor's London Environmental Strategy.	6.1	2.8	5.1	-	5.1	-
	Total Energy	6.1	2.8	5.1	-	5.1	-
TOTAL PCE		126.3	116.9	82.9	1.3	84.2	35.2

6 Financial Implications

- 6.1 A summary of the 2018 Business Plan to 2024/25 by financial year is shown in Table 3.

Table 3 – PCE Programme Business Plan to 2024/25

Costs and Funding (£m Outturn)	Prior Years	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	Total
Financial Authority	50.5	12.1	18.0	13.8	5.6	12.3	14.1	126.3
Existing Prog/Proj. Authority	46.9	15.3	17.7	3.0	-	-	-	82.9
Authority Requested	-	-	1.3	-	-	-	-	1.3
Total Prog/Proj. Authority	46.9	15.3	19.0	3.0	-	-	-	84.2
Business Plan	46.9	12.1	18.0	12.7	5.6	12.3	14.1	121.6
Programme EFC	49.8	7.4	15.8	11.9	5.6	12.3	14.1	116.9

7 Challenges, Opportunities and Lessons Learnt

- 7.1 The introduction of the prioritised power work bank in 2018 has enabled the Programme to successfully deliver more projects and close out the most critical items on the annual Asset Condition Report (ACR). Following a review of the 2019 ACR, further projects have been identified and prioritised. This has been undertaken using a value management approach to ensure that the most critical and strategically important interventions are prioritised first.
- 7.2 The three sites being progressed within the RE:FIT solar project have all undergone extensive pre-feasibility works using lessons learnt from the Acton Railway Engineering Workshop (REW) experience. Here it was found that remediation of poor roof condition resulted in REW becoming economically non-viable.

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 power, cooling and energy sub-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 the continuous assurance.
- 9.3 An Integrated Assurance Plan for the Programme has been agreed with TfL Project Assurance for the next 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: 18 December 2019

Item: London Underground Four Lines Modernisation Programme

This paper will be considered in public

1 Summary

London Underground Four Lines Modernisation Programme (4LM):				
Existing Financial Authority*	Estimated Final Cost (EFC)	Existing Programme and Project Authority	Additional Authority Requested	Total Programme and Project Authority
£5,267m	£5,352m	£5,412m	£0m	£5,412m

*Note: Existing Financial Authority is prior year actual costs, 2019/20 Budget and the 2018 Business Plan to 2023/24

- 1.1 The purpose of this paper is to update the Committee on progress with delivery of the London Underground (LU) Four Lines Modernisation (4LM) Programme.
- 1.2 A paper is included on Part 2 of the agenda, which contains exempt supplementary information. The information is exempt by virtue of paragraph 3 of Schedule 12A of the Local Government Act 1972 in that it contains information relating to the business affairs of TfL. Any discussion of that exempt information must take place after the press and public have been excluded from the meeting.

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 LU Sub-surface Railway (SSR) consists of four lines – the Metropolitan, District, Hammersmith & City and Circle lines. It carries 1.3 million customers each day which is 25 per cent of the overall LU ridership.
- 3.2 In July 2015, the Board approved Programme and Project Authority of £5.4bn to undertake the Programme, with the full benefits realised by 2023. The authority consists of 192 new trains, track layout changes, upgrades to three depots which will maintain the trains and new signalling (and associated signalling works). With the completion in 2016 of the introduction of the new fully walk through, air conditioned trains (known as the S7 and S8 fleets), most of the work is complete except for the signalling works.

- 3.3 A contract was awarded in July 2015 to Thales Rail Signalling Solutions to signal the SSR with an automatic, modern signalling system. The system is similar to the one that has been successfully installed on the Jubilee and Northern lines. Given the scale, the SSR has been split into fifteen sections (known as Signal Migration Areas) for the purpose of introducing the new signalling system. Work is well advanced in the design and installation of the new signalling system and the delivery of the supporting infrastructure. The first three of these Signal Migration Areas between Hammersmith and Euston Square/Finchley Road have been commissioned this year with trains operating automatically on that section of the route.
- 3.4 Once completed, the 4LM Programme will add capacity (through improved train frequency) and improve journey times. The Programme is in the process of replacing, modernising and integrating life-expired assets (Signalling, Rolling Stock, Track, Power and Depots) on the SSR. It is the largest single upgrade in the history of our network. Due to its scale and interoperation with other London Underground lines, Train Operating Companies and Network Rail it is very complex. In fact, the scale and complexity of upgrading these four lines in one programme is a global first and will transform the overall experience for our customers.

Programme

- 3.5 The table below shows the planned timetable improvements set out in the July 2015 Board paper. Current service levels are between 22 and 27 trains per hour (tph) on the central area (Circle Line) of the SSR.

Description	Planned Timetable Date
Journey time improvements on central area sections	May 2021
30tph in central area for 90 minute peaks	December 2021
32tph in central area for 90 minute peaks	May 2022
32tph in central area for three hour peaks	December 2022
32tph in central area and 28tph on Metropolitan trunk for three hour peaks	May 2023

- 3.6 The programme is currently on track to deliver journey time improvements in the central area in May 2021, in line with the target set out in the 2015 Board paper. Further increases to 32 trains per hour are then planned to be in service by the dates shown in the table above.
- 3.7 However, given the delivery and performance challenges faced to date (further explanation in paragraphs 5.11 to 5.15) it should be noted that there is now very little spare margin in the Programme to achieve the original target dates.

4 Benefits and Value

- 4.1 The introduction of the 192 new trains has delivered 25 per cent of the programme benefits which include:
- (a) the first step up in capacity while maintaining the current train service frequency as the new trains are longer and carry more passengers;
 - (b) an improved customer experience with walk through gangways, in-car CCTV, air conditioning, a Rail Vehicle Accessibility Regulations (RVAR) compliant saloon and improved Customer Information Systems; and
 - (c) the opportunity to recover energy through regenerative braking.
- 4.2 The introduction of the new signalling will deliver 75 per cent of the programme benefits which include:
- (a) the ability to run trains closer together increasing service frequency up to 32 trains per hour; and
 - (b) speed increases which reduce journey times between stations.

5 Progress in the last year

- 5.1 The Programme is currently on schedule to deliver the timetable dates in paragraph 3.5 and is below budget.
- 5.2 We have completed track layout changes in 27 out of 29 areas. The remaining two areas at Royal Oak and Aldgate East will be delivered by January 2020. These changes allow trains to run faster and deliver maintenance cost savings by installing modern track. We have built 37 signal equipment rooms ready for Thales to install their signalling equipment. There are nine more in progress, with all works planned to be completed by June 2020. There is a total of 149km of new cable route management system to be installed of which 136km have been installed to date. A total of 450km of cable has been installed with a further 2,000km of cable to be installed by the end of the project. All wayside assets works will have commenced in the next 12 months with completion expected in early 2021.
- 5.3 Nosing stones on platform edges are being moved to reduce the gap between the train and the platform, making it safer for customers to board and alight trains. We have completed the nosing stone realignment programme, with 76 platforms realigned.
- 5.4 We are planning to make further 'Platform Train Interface' (PTI) improvements at Baker Street, where most customer incidents occur. The initial trial of extending the hours of when public address announcements are made was successful, with a marked reduction in PTI incidents after 8pm and a further extended trial is planned subject to additional mitigations being put in place to address noise impacts from the public address system. The feasibility of a directional speaker is under consideration. Additionally, the feasibility of introducing a longer-term solution to reduce the gap between the train and the platform has been accelerated. Under the proposal a section of platform would extend and retract to meet with the doors of a train (referred to as an 'active-gap-filler').

- 5.5 Upgrade works at Ealing Common Depot bringing new facilities to allow maintenance of the new train stock have progressed well. One of the three sheds has already been brought back into use and the remaining two sheds are on target to be completed as planned by the end of the year. Additional extensive track replacement within the Depot has also been delivered. This has further improved reliability and has been achieved while half the depot has remained operational to minimise disruption to the operation of the railway for our customer. At Upminster depot, works are complete and have been brought into use for the depot staff. Design work at Neasden depot is complete and enabling works have commenced.
- 5.6 We have completed the final stage of the upgrade to the power supply. By introducing regenerative braking, which is an energy recovery mechanism, we will have achieved a cumulative saving of £35m in energy costs in six years since a substantive part of the new fleet of trains were running in 2013.
- 5.7 All 192 trains, 133 seven-car trains for the Circle, District and Hammersmith and City lines and 59 eight-car trains for the Metropolitan line have now been fitted with the new Automatic Train Control system. Furthermore, 24 Engineering Trains have been fitted out of a total fleet of 29 trains, with the remainder planned in early 2020.

Closures

- 5.8 We carefully monitors the use of weekend closures in order to ensure that each closure is used as efficiently as possible for installation and testing of the new signalling system and infrastructure. Crucially, they are also used to familiarise Train Operators with the new system.

Go Live

- 5.9 On 17 March 2019 the first section of our new signalling system was successfully implemented on the Circle and Hammersmith & City lines between Hammersmith and Latimer Road stations. This was achieved without major disruption to the network representing a significant programme milestone.
- 5.10 This was followed on 2 September 2019 from Latimer Road (Hammersmith & City and Circle lines) to Finchley Road and Euston Square (Metropolitan, Hammersmith & City and Circle lines) and Paddington (Circle and District lines) with trains operating automatically on those sections of the route. This was a huge step forward in overhauling the signalling system on some of the oldest and busiest parts of the network. This area includes two major junctions and three major stations: Paddington, Edgware Road and Baker Street.
- 5.11 All train operators were fully trained and certified to operate with the new signalling system prior to its introduction. However, as part of our commitment to safety, all train operators had to accompanied through the newly-upgraded section by an Instructor Operator the first few times they went through the area. We refer to this as 'familiarisation'. The need to familiarise train operators meant we had to operate a reduced service in the immediate week following the go live of the new section.

- 5.12 Since then there have been a number of lengthy disruptions. Whilst the number of failures of the new signalling system has been lower than expected, the duration of some failures has been much greater than predicted, resulting in significant delays for our customers.
- 5.13 Many of the delays encountered by our customers have been caused by trains losing communication with the new signalling system, resulting in trains halting and not being able to establish reconnection. We have implemented immediate improvements to signalling equipment on trains and beside the track. Software improvements are also planned.
- 5.14 Plans are being developed to manage and minimise the impact of the District Line Train Operator familiarisation as well as building acceptable performance in the new signalling areas before the next section of the network goes live next year.
- 5.15 More detail on the challenges and recent commercial discussions with Thales are included in the paper on part 2 of the agenda.

6 Assurance

- 6.1 A TfL Project Assurance and Independent Investment Programme Advisory Group (IIPAG) Assurance Review of the Programme took place in November 2019. There were two critical issues identified. All the recommendations from the reports are being addressed, as detailed in the management response.

List of appendices to this report:

Appendix 1: Table of capacity increases

List of background papers:

IIPAG and TfL Project Assurance Reports

Management response to IIPAG and TfL Project Assurance Reports

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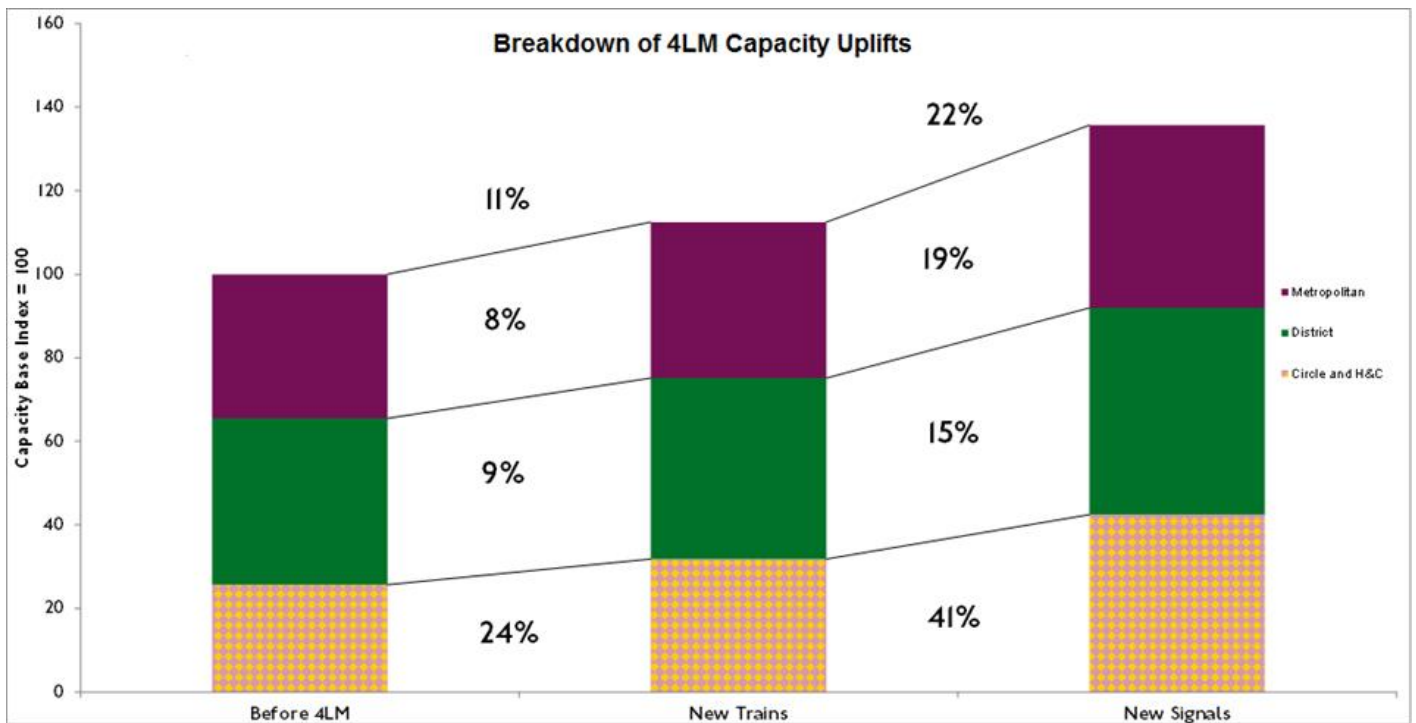
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Appendix 1

Capacity Increase

The table below shows the breakdown of capacity improvements provided by the 4LM programme. The chart shows the increased contribution of trains and signalling for each line group compared to the pre-upgrade capacity. The Metropolitan Line (Purple) has growth of 8 per cent and 19 per cent, the District Line 9 per cent and 15 per cent. Whilst the Circle and Hammersmith & City Lines will respectively gain capacity growth of 24 per cent and 41 per cent.



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Programmes and Investment Committee



Date: 18 December 2019

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 Plan Development

- 3.1 The Board and its Committees and Panels have forward plans. The content of the plans 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 Plan

- 4.1 The current plan is attached as Appendix 1. Like all plans, it is a snapshot in time and items may be added, removed or deferred to a later date.

List of appendices to this report:

Appendix 1: Programmes and Investment Committee Forward 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)

5 March 2020		
Use of Delegated Authority	General Counsel	Standing item
Crossrail Update	MD LU	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.
Second line Assurance Activities	Project Assurance	Standing item
IIPAG Quarterly Report	Project Assurance	Standing Item
LU Major Stations	MD LU	Annual update
Rolling Stock Renewals	MD LU	Annual approval
LU Signals and Control	MD LU	Annual approval
Northern Line Extension	MD LU	Annual update
Piccadilly Line Upgrade	MD LU	Approval
HS2	MD ST	Updating delegated authority
DLR Rolling Stock Replacement	MD ST	Annual approval
Surface Asset Programme	MD ST	Annual approval

Programmes and Investment Committee Forward Planner 2019/20

Public Transport	MD ST	Annual approval
Crossrail Central Operating Section Traction Power Arrangements	MD LU	Approval

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

Items to be scheduled:

- London Overground future planning
- Bakerloo line extension (City Planning and LU)
- Rotherhithe to Canary Wharf Ferry
- Surface Technology (June 2020)

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.