

Date: 18 May 2022

Item: London Underground Technology Programme

This paper will be considered in public

1 Summary

LU Technology Programme					
Existing Financial Authority	Estimated Final Cost (EFC) (To March 2025)	Full Programme EFC	Existing Programme and Project Authority	Additional Authority Requested	Total Authority
£ 265.7m	£ 266.9m	£541.1	£ 162.6m	£ 63.3m	£ 225.9m

- 1.1 This paper is the second annual submission for London Underground (LU) Technology Programme (the Programme). It summarises programme delivery since our last update, gives an overview of planned business investment and requests £63.3m of additional Programme Authority to cover planned investment in 2022-23 and 2023-24. This paper requests Programme and Project Authority (P&PA) to cover existing and planned commitments in future years.
- 1.2 The Programme is an annualised rolling programme to renew our operational technology in LU. These works enable us to continue to use technology effectively to support our operations, ensure compliance with relevant legislation and drive improvements for our customers.

2 Recommendations

2.1 The Committee is asked to note the paper, and:

- (a) approve additional Programme and Project Authority of £63.3m for the London Underground Technology Programme, giving total Programme and Project Authority of £225.9m; and
- (b) note that Procurement Authority in respect of the various elements of the London Underground Technology Programme will be sought at officer level in accordance with Standing Orders.

3 Background

- 3.1 The Programme was established in October 2020 to address the need to renew our core technology assets and systems in a more co-ordinated manner, while exploring new opportunities to improve network safety and customer security. The Programme focusses on ensuring our 'operational technology' is kept in a

good state of repair and renewed accordingly. Operational technology in this context falls into three main inter-linked asset categories, outlined in Figure 1 below.

Connectivity and Networks	Assets and Staff Tools	Cyber, Data and Digital
Voice and Data Communications	Staff Devices and Body Worn Cameras	Cyber Security and GDPR compliance
Station Security and CCTV	Asset Obsolescence	Data Storage and Visualisation
Train Monitoring (Tracker-Net)	Workforce Planning and Scheduling tools	Performance Data Updates and Improvements
Staff and Operational Wi-Fi	Revenue Protection	Asset Condition Data and Reporting

Figure 1: Overview of Operational Technology Categories

- 3.2 In October 2020, the Committee approved the transfer of £94.7m of Programme and Project Authority to streamline the delivery of various operational technology projects into a single programme that supports a strategic and integrated technology approach across the LU estate. Since then, the Committee has approved further transfers from other programmes, bringing total Programme and Project Authority to £162.6m.
- 3.3 To date the Programme has spent £102m and committed to a further £57.1m. Most of the committed expenditure relates to the Connect programme which is a major investment in our communications networks. By March 2023, we plan to spend £134.9m with further commitments estimated at £56.1m at that point, raising our total commitment to £191m. By March 2024, we expect to have spent £207.5m with further commitments of £18.4m, bring our total commitment to £225.9m
- 3.4 The phasing of the approved Programme and Project Authority may be adjusted across the years 2022/23 and 2023/24 to meet in-year business requirements, for example if there is opportunity to accelerate work-bank projects
- 3.5 Of the £266.9m estimated cost of the programme to 2024/25, over ninety per cent is to be spent on renewals projects. All spend in 2022/23 will fund renewals projects though it should be noted that, in technology projects, renewal works almost always entails some elements of enhancement.
- 3.6 Financial Authority is currently provided through the two-year Budget for 2021/2022 and 2022/23, approved by the Board on 28 July 2021. The current funding agreement with Government expires on 24 June 2022. Any Authority granted which relates to both the current funding period and commitments that

extend beyond the period of the Business Plan and Budget may need to be revised as part of future budgets to be considered by the Board.

- 3.7 If additional funding is not available, a prioritisation of the TfL Investment Programme will be required, some programmes and projects will not be taken forward and revised authority will be sought as appropriate. All approvals given will be overseen in accordance with TfL Business controls in respect of draw down.
- 3.8 Since the establishment of the Programme, we have successfully delivered seven projects, continued to make substantial progress on the larger multi-year projects, established effective programme governance, and aligned the Programme to our Long-Term Capital Plan (LTCP).
- 3.9 The Programme has adopted an “annualised work-bank” approach, whereby projects are added to the programme each year according to the LTCP, with a strong focus on addressing obsolescence issues and maintaining core assets in a state of good repair. This approach ensures that projects are prioritised according to operational impact and tangible customer benefits and means that projects addressing safety and compliance are progressed as a matter of urgency.
- 3.10 Over the last few years, we have been in a challenging financial position and therefore deferred non-essential spend. As a result, the majority of planned spend in the Programme is focussed on supporting essential business functions, including collecting revenue and keeping our systems running, as well as upgrading systems and processes to be compliant with legislation (e.g. General Data Protection Regulation). Due to historical deferral of planned investment, all Programme spend is now essential.
- 3.11 We continue our prioritisation exercises, driven by the ongoing funding negotiations with Government. Any further investment reductions will come with substantial operational risks as we will not be able to carry out essential activities across our portfolios, including critical renewals work.

4 Programme Delivery 2021-22

- 4.1 The coronavirus pandemic and the resulting impact upon TfL’s finances had a significant impact upon programme delivery, particularly in 2021/22, with supply chain issues, material shortages and internal resource constraints all contributing to delays on several projects. As a result, overall Programme spend was less than forecast. Our original forecast expenditure for 2021/22 was £38m against an outturn of £34m.
- 4.2 To help mitigate against a recurrence, we have undertaken a detailed deliverability review of the Programme. While we expect to spend approximately £32.9m in 2022/23 and £68.2m in 2023/24, there are considerable resource constraints within the organisation and supply chain. We will continue to monitor our forecast spend and work to improve our understanding of the strategic risks to delivery in 2022/23 and beyond.

- 4.3 The Programme initially consisted of 12 projects, seven of which were temporarily paused as part of our response to the coronavirus pandemic. In 2021, we re-started all paused projects, except “Feasibility Studies/Minor Interventions” which was removed from the Programme because no specific scope for this work had been identified. We are currently developing a register of feasibility studies and innovative proof of concept work subject to prioritisation, assessment of likely benefits and funding availability.
- 4.4 Since our last submission, we have also delivered seven projects successfully, including rolling out over 7,000 replacement hand-held devices and 4,500 new body worn cameras to our operational staff. These projects have meant that we can continue to provide excellent customer service, whilst keeping our people safe. A summary of these completed projects and the progress made on continuing projects is contained in Appendix 1. Additionally, three further small-scale renewals projects were initiated and delivered by the Programme since our last submission:
- (a) replacement of the LU Control Centre video wall (£0.4m);
 - (b) capturing of key asset condition data to enable more efficient maintenance, relating primarily to mechanical assets such as pumps and drainage systems (£0.3m); and
 - (c) renewing our scheduling systems for operational staff at stations (£1.5m).
- 4.5 There were two projects that had notable Estimated Final Cost (EFC) increases during this period, which are:
- (a) Asset Management Information System (AMIS): This project will improve our ability to maintain our assets in a state of good repair, by introducing a single consolidated asset management system. Due primarily to supplier performance issues, this EFC has risen by £5.4m and the final delivery date has been delayed by 15 months. We are continuing to mitigate these impacts by bringing additional phases of the work in-house and undertaking a full review of the scope and delivery plan to seek further efficiencies. The project is now scheduled for completion in mid-2023; and
 - (b) Station Security Technology Integration Programme (SSTIP): SSTIP will improve our ability to respond to critical incidents on the network, helping us keep our customers safe. The delivery of SSTIP has been delayed by around four months since our last submission. This is due primarily to resource shortages and delays related to the pandemic. Accompanied by increased material costs, this has led to an EFC increase of £1.6m since our last submission. We are working to reduce the impact by seeking efficiencies from bulk purchasing and reviewing the scope and delivery model for the Programme.

5 Investment Plan 2022/23 – 2023/24

- 5.1 In 2022/23, the Programme consists of fifteen projects, ranging from significant infrastructure works such as Connect to smaller renewals of back-office systems.

While projects within the Programme will deliver outcomes specific to London Underground, several are part of wider efforts across TfL to improve customer services and business operations. For example, the Revenue Protection project is part of a pan-operational work-stream to tackle fare evasion.

- 5.2 Eleven of the projects within the 2022/23 work-bank are expected to continue into 2023/24 and we also expect to add projects to the value of £4.4m to the programme in 2023/24, based on our prioritised work-bank of necessary renewals. Appendix 2 provides an overview of these projects.
- 5.3 The increased EFC of the programme is due primarily to the addition of new projects from the work-bank in line with our LTCP, which will occur each year. The EFC and annual spend for this 'future work-bank' have therefore been included in this paper. The final composition of the Programme for 2022/23 and future years remains subject to ongoing prioritisation of TfL capital investment portfolio and outcomes of any funding settlements with the central Government.

Summary of Significant Programme for 2022/23

- 5.4 Figure 2 below sets out the key information for the five significant projects within the Programme, with further commentary provided below:

Project	Baseline EFC (£m)	Current EFC (£m)	Baseline Forecast Completion Date	Current Forecast Completion Date
Connect	99.6	92.9	March 2025	March 2025
Future Operational Network	48.0	48.0	March 2027	March 2027
Asset Management Information Systems	20.3	25.7	April 2022	July 2023
Station Security Technology Integration Programme	38.4	40.0	November 2024	February 2025
Workforce Planning	14.5	14.5	March 2026	March 2026

Figure 2: Overview of Significant Projects

Connect

- 5.5 The Connect system is an operational network which provides communication services between LU control centres, stations, train drivers and station staff, and links a wide range of applications critical to the operation of the network. It is essential to the ongoing reliable and safe functioning of the LU network. The Connect system was introduced in 1999 and is now facing obsolescence and increased risk of asset failure. The Connect project was established to address this obsolescence risk and consists of a series of capital upgrades to enable the continued effective operation of the Connect system beyond 2026.

Future Operational Network

- 5.6 Several networks that TfL uses to provide critical services such as CCTV, data and radio links are also facing obsolescence beyond 2026. The Future Operational Network project will develop a new operational communication strategy and deliver a new network that will address these issues and ensure that TfL has a data network capable of meeting the needs of future demand. This project will design the future of our operational networks into the 2030s and beyond, then deliver the necessary improvements to consolidate our various

data networks, helping to reduce complexity and whole life costs across the business. This project is in the early stages of development and is planned to be complete in March 2027.

Asset Management Information Systems - AMIS

- 5.7 To keep our network operating effectively, we must continue to invest in the maintenance and renewal of critical assets. An effective asset management system is vital to both target that investment in the most cost-beneficial manner and support day-to-day operations. The AMIS project will consolidate the various asset management systems used by LU into a single, consolidated structure and support the delivery of a fully integrated asset operations team. The successful delivery of the AMIS project will enable us to deploy maintenance staff more effectively and work to realise necessary efficiency savings in maintenance.
- 5.8 The project is part of a wider pan-TfL effort to consolidate asset management systems, with other parts of TfL also migrating to the same asset management system. This convergence to a single management system will improve asset management capability across the organisation.

Station Security Technology Integration Programme - SSTIP

- 5.9 Since our last update, SSTIP has delivered “Critical Incident Management” functionality at 62 stations. This provides us with the ability to remotely control and evacuate a station in the event of a critical incident, such as a terrorist attack. We have also upgraded our CCTV at 75 stations, allowing footage to be remotely viewable by the British Transport Police and their policing partners, and are working with the Train Operating Companies to enhance CCTV at key interchange stations.
- 5.10 These improvements have been recognised in the recent Harris Report (2022)¹, which noted the bolstered resilience of our critical incident management capability and our investment in improving our remote response capability. Lord Harris further recommended that “TfL must treat this as a priority to ensure the remaining stations secure enhanced remote response capabilities in due course.”
- 5.11 We are now rolling out these upgrades across the remainder of the LU estate, whilst working to update our engineering standards to allow us to better resolve obsolescence issues and integrate our assets more quickly and efficiently.

¹ Harris, T (2022). London Prepared: A City-Wide Endeavour – An Independent Review of London’s Preparedness to Respond to a Major Terrorist Incident. Retrieved from <https://www.london.gov.uk/mopac-publications-0/london-prepared-city-wide-endeavour>

Workforce Planning

- 5.12 Workforce Planning (WFP) is the set of processes we use to ensure that we have the right staff in the right place at the right time. These are critical and complex processes in running the network and deploying over 15,000 staff across London. Currently, we use several systems and processes to support our workforce planning, many of which are facing obsolescence beyond 2026. This project will deliver a renewed workforce planning capability in advance of 2026 and will look to address existing pain points such as a reliance on manual data processing and a lack of visibility of schedule efficiency which can result in cancelled trains or closed stations.
- 5.13 Whilst a distinct project within the Programme, WFP forms part of our organisation-wide Enterprise Resource Planning (ERP) strategy and is aligned with the other projects within that strategy. There are several inter-dependencies between WFP and the broader ERP strategy, which is also at an early stage of development, and we are also currently exploring opportunities to improve value-for-money by combining WFP with a similar Work-force Management Project within the Surface Technology programme.

6 Financial Implications

- 6.1 The forecast cost of the Programme is set out in Figure 3. This covers the life of the five-year Business Plan and includes:
- (a) Financial Authority of £265.7m to 2024/2025;
 - (b) EFC of £266.9m to 2024/2025; and
 - (c) Existing Programme and Project Authority of £162.6m
- 6.2 The Programme plans to make annual submissions to the Committee to request the Programme and Project Authority required for the onward financial year. Subject to approval of this paper, the next Programme-level request is planned for March 2023.

Project	Financial Authority to 2024/25	Cost to 2024/25	EFC – Full Programme	Spend to Date - P1 FY22/23	Existing P&PA	P&PA Allocation*	Future Authority Requests
Connect	92.9	92.9	92.9	39.1	82.1	92.9	0
AMIS	26.3	25.7	25.7	16.1	19	25.7	0
SSTIP	39.9	40	40	11.4	21.9	30	10
Revenue Protection Programme	3.4	1.6	1.6	1.1	3	1.6	0
Competency Management System	2.6	3.1	3.1	0.5	2.7	3.1	0
Station Staff Scheduling System (SSSS)	1.7	1.5	1.5	1.4	1.5	1.5	0
RailSys	2.5	2.5	2.5	0	0	2.5	0
Future Operational Network	26	35	48	0	0	11.5	36.5
Staff Devices (Tranche 2)	12	7	12	0	0	4.5	7.5
Performance Data Warehousing	2	2	2	0	0	2	0
NACHS 5G	0.2	0.2	0.2	0	0	0.2	0
EIRF/CUPID	2	2	2	0	0	2	0
LU Cyber-Security Improvement Project	2	3	3	0	0	2	1
LU Workforce Planning	12.5	12.5	14.5	0	0	8.5	6
Customer Operations Modernisation	3	1.1	3	0	0	1.1	1.9
Future Work-bank	4.4	4.4	256.7	0	0	4.4	0
Sub-Total	233.4	234.5	508.7	69.6	130.2	193.5	62.9
Completed Projects	32.4	32.4	32.4	32.4	32.4	32.4	-
Total	265.7	266.9	541.1	102	162.6	225.9	62.9

Figure 3: Overview of Spend to Date and Project Authorities (All figures in £m)

(*subject to approval of this paper)

7 Equalities Implications

- 7.1 TfL has an obligation under the Equality Act 2010 to:
- (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Equality Act 2010;
 - (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it; and,
 - (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.
- 7.2 The Programme will be delivered in accordance with the Equality Act 2010. Consideration is given to the need for an Equality Impact Assessment for each project. For the LU Technology Programme, particular areas of focus include protection of data, customer information, ensuring our systems are user friendly and are kept in a good state of repair, and improving safety and security for all of our customers.

8 Assurance

- 8.1 An Integrated Assurance Review on the LU Technology Programme was carried out in March 2022 by the TfL Assurance Team and the Independent Investment Programme Advisory Group (IIPAG). No critical issues were identified by IIPAG or Project Assurance.
- 8.2 The Integrated Assurance Plan will be updated to set out the reviews for projects within the Programme for the next 12 months.

List of appendices to this paper:

Appendix 1: Summary of Key Delivery Performance

Appendix 2: Composition of LU Technology Programme 2022-2023

Appendix 3: Overview of Expected Spend

List of Background Papers:

IIPAG and Independent Assurance Review (IAR)

Management Response to the IAR

Contact Officer: Alexandra Batey, Director of Investment Delivery Planning
Email: AlexandraBatey@tfl.gov.uk