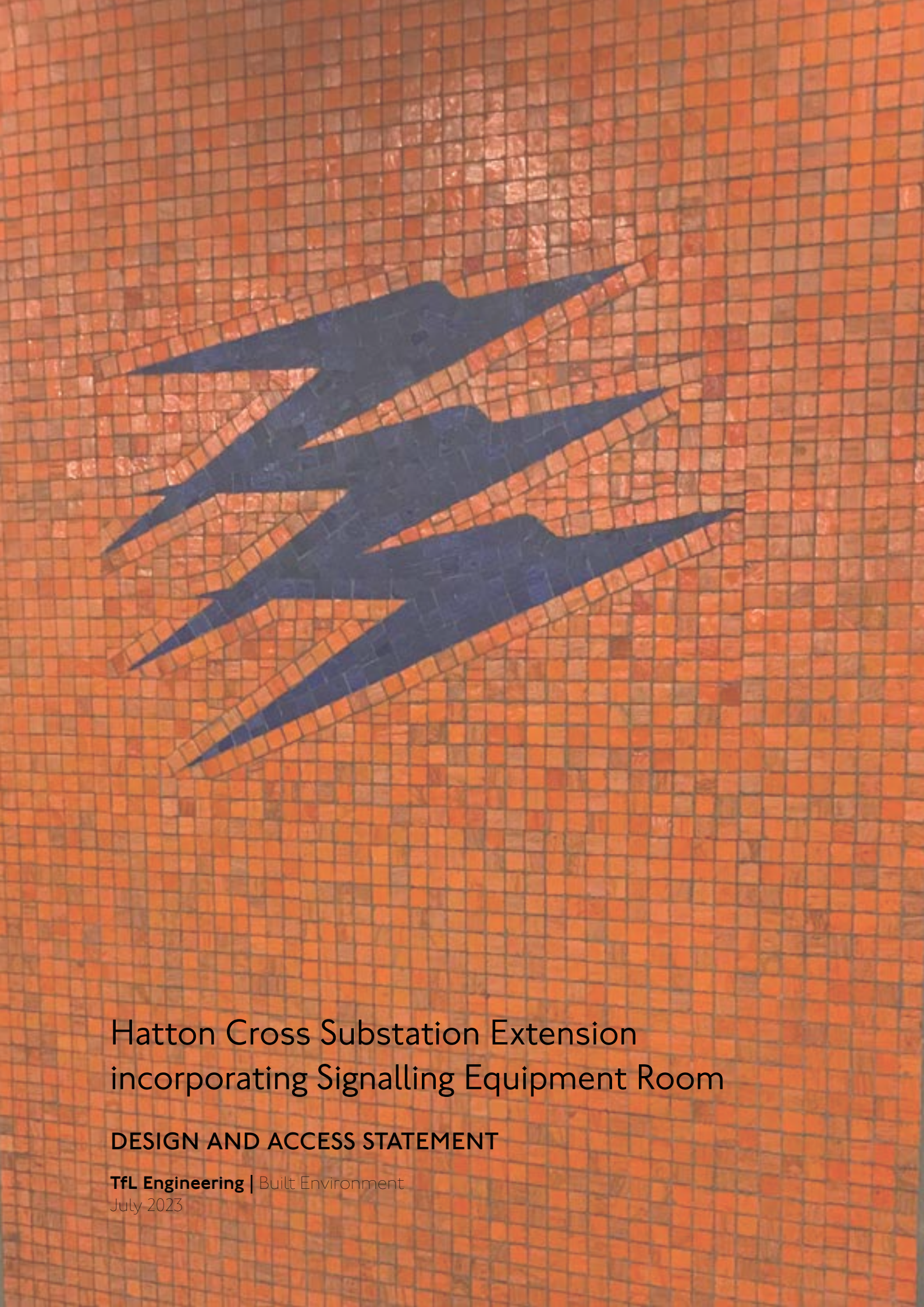

Hatton Cross Substation Extension incorporating Signalling Equipment Room

DESIGN AND ACCESS STATEMENT

TfL Engineering | Built Environment
July 2023

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1. Executive summary

The Piccadilly Line Upgrade (PLU) Programme plans to upgrade the Piccadilly line through the introduction of a new generation of high-capacity, walk-through, air-cooled trains, with modern signalling control systems and supporting infrastructure. Hatton Cross substation is one of ten high voltage substations to be upgraded including the low voltage assets.

- Stage 1 – New train introduction and service uplift from 24 to 27 trains per hour.
- Stage 2 – New Signalling System and service, increase to 36 trains per hour.

The PLU is projected to support 25,000 new jobs across the primary, secondary and tertiary supply chain and enable economic growth; improving local services and supporting the construction of a projected additional 61,000 new homes.

The Hatton Cross substation extension and upgrade proposal is required as part of the Piccadilly Line Upgrade (PLU) incremental changes over the larger TfL network upgrade scheme to meet 21st Century transportation demands in line with Hillingdon's Local Implementation Plan (LIP) and the Mayor of London Transport Strategy (MTS).

The current substation floor area is insufficient to accommodate the required Hatton Cross substation electrical and mechanical equipment upgrade, therefore a built extension to the existing building is required. The proposed extension is to the east of the existing station, occupying a partially paved and one of the smaller greenery planter zones that are owned by London Underground Limited (LUL).

This Design and Access Statement should be read in conjunction with the following supporting information, submitted for Part 18, Class A Prior Approval:

- Planning Statement
- Planning Drawings
- All supporting information listed in the above.

This documents the decision-making process as well as the final proposal.

Figure 1. Location of station and substation (image shows the boundary between Hillingdon and Hounslow)

2. Site and context

2.1. Hatton Cross station

Hatton Cross station is in the borough of Hillingdon, and also serves the borough of Hounslow. The station opened in 1975 as a temporary terminus of the Piccadilly Line extension from Hounslow West and was the main connection to Heathrow Airport until the opening of Heathrow Central (now Heathrow Terminals 2 & 3) in 1977. It is located between the Great South West Road (A30) and the Heathrow Airport Southern Perimeter Road.

It is one of the best-preserved Underground stations built in the 1970s, executed in a Brutalist style in concrete with thoughtful robust detailing, which includes the sculpted concrete cornice, by William Mitchell. Another element of local interest is the signage on the Hatton Road (leading to the South Perimeter Road) side of the building, which we will preserve. The Hatton Cross station is (within travel zones 5 and 6) an architectural standout landmark for the local area. While the station is not a listed building or part of any local listings, and does not lie within or near any conservation areas, it is considered of local interest and as such, any changes affecting the external envelope are subject to approval by the local planning authority.

The station's brutalist design is functional and utilitarian, with a strong focus on simplicity and efficiency; the station, including the substation, is considered a

Hatton Cross

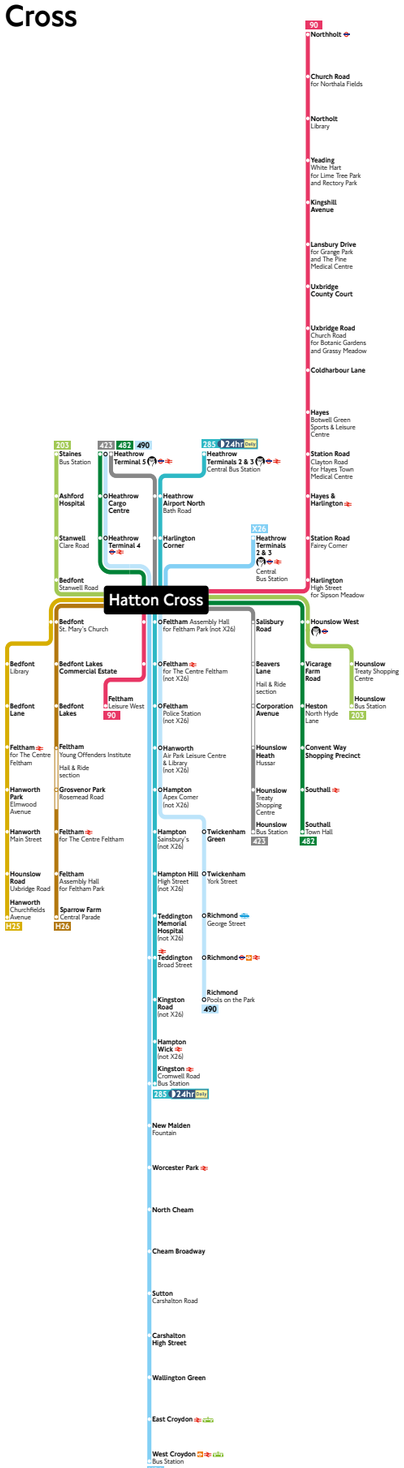

Figure 2. Hatton Cross Station bus routes

sensitive site due to its proximity to Heathrow Airport, therefore attention is required to ensure that any changes do not compromise the safety and security of staff, customers and the general public. Hatton Cross (Underground and Bus) station is positioned in the northwest corner of the Great South-West Road (A30) and Hatton Road intersection. The Southern Perimeter Road and Heathrow Airport are located to the north and west of the Hatton Cross station building. The multi-storey Hatton Cross Centre is located to the northeast, with the Atrium Hotel to the southeast and Sixt car hire/ rental in the south.

There is existing staff and public car parking to the west beyond the station building, with Electric Vehicle (EV) charging ports beneath the flat roof canopy. Lockable bicycle storage racks are positioned in front of the south elevation station entrance, these are located to the rear of the engineering brick dwarf wall planters and beneath the flat roof canopy.

The station provides services to a large area that includes Feltham and Bedfont. It also serves a small residential community in Hatton, and commercial warehousing and light industrial premises connected to the airport.

The bus station is served by London Bus routes 90, 203, 285, 423, 482, H25, H26 and X26.

2.1.1. The substation

The Hatton Cross substation forms part of the main body of the station, located on its northeast end. It is not accessible to the general public.

2.1.2. Existing station access

Curtain walling sections to the north and south elevations form the cross-sectional link between the station and bus station public entrances and provide level access to the ticket hall.

Figure 3. Hatton Cross Underground Station, Piccadilly line by J Wender (1976) ©London Transport Museum

Figure 4. Hatton Cross Underground Station, Piccadilly line by W H R Godwin, 1975 ©London Transport Museum

Figure 5. Hatton Cross Underground Station, Piccadilly line by J Wender,1976 ©London Transport Museum

2.1.3. External building features

The external walls are clad with glazed blocks to the north, east and south elevations with painted sections at high level; large vertical concrete fins with louvres and robust insect mesh infill servicing the ventilation shaft. The building is capped with a concrete flat roof with reinforced concrete upstand parapet and painted metal balustrade secured to its rear.

Dwarf wall brown engineering brick retaining planters to the south and part of the east elevations are positioned around the columns. The engineering brick dwarf walled planters house shrubs and vegetation along the south elevation, with shrubs and (non-TPO) trees along the east elevation.

Left of the curtain wall station entrance on the south elevation there is a timber-clad steel frame enclosure around the staff bicycle store and infill between the precast concrete stair side walls leading up to the flat roof.

Figure 6. View from Great South West Road

Figure 7. View from bus station

Figure 8. Curtain walling at the entrance

Figure 9. Cornice detail

HATTON CROSS STATION

HERITAGE FEATURES

Listed Status: not listed | Conservation Area: no | Audit date: 23 April 2017

HISTORY

Opened on 19 July 1975 as the temporary terminus of the Piccadilly Line extension from Hounslow West. Services to Heathrow Central (now Heathrow Terminals 2 & 3) commenced on 16 December 1977.

DESIGN

Access to the station is by means of a huge entrance lobby containing seating and shop units. Doors within the floor-to-ceiling glazed side walls lead to the adjacent bus station and on to the Great South West Road (the A30). The ticket hall is separated from the lobby by a series of glass doors, with the red door handles shaped as half-roundels. The hall itself is fairly simple in design, with beige wall and floor tiles the predominant finish used. Access to the platforms takes a rather unusual form for an Underground station, for it is by means of open staircases down to a concourse landing, from which two wide staircases extend to low level. The platform is typical of the sub-surface design developed for the Heathrow extension, and the colour scheme of muted green on the platform facing walls, beige on the trackside walls and bright orange (with the blue triple 'Speedbird' motif designed for Imperial Airways in 1932, adopted by the British Overseas Airways Corporation in 1939 and then by British Airways from 1974-1984) on the inner faces of the columns forms a coherent and integrated design aesthetic.

HERITAGE HIGHLIGHTS

Possibly the best preserved of the Underground's very few 1970's stations, executed in a Brutalist style in concrete with thoughtful detailing including a sculpted concrete cornice and other precast elements. The unusual repetition of 4 no. internally illuminated style roundels is unique. It is unusually rich in the survival of original structures, fixtures and finishes: door handles shaped as half-roundels; vertical slit windows with orange melamine jambs; granolithic compound floors; impressive double staircase with orange mosaic detailing, varnished timber headwall panel and stainless steel handrails; 'gull wing' platform canopy with tiled columns featuring orange tesserae inset with blue triple 'Speedbird' motif; backlit illuminated roundels; brushed stainless steel metal edging and finishing, including door surrounds and fire equipment cases.

Figure 10. TfL Heritage Railway Features document - Hatton Cross

HATTON CROSS STATION
HERITAGE FEATURES IN DETAIL

EXTERIOR

Massive, free-standing concrete portal frame block providing four stark elevations, inset by a high lobby at eastern end that forms the station entrance. The northern elevation, that also has a plain wing to the eastern edge, partially overhangs to form part of the integrated bus station (a - b) The eastern elevation is pierced with vertical ventilation grilles, in deep brown (c)

The southern elevation is partially inset, with glazed panels forming part of the entrance, and with vertical glazed panels to the west that illuminate the ticket hall (d - e) The western elevation is massively undercut to form access to a car parking area (f)

EXTERIOR

The whole structure is capped by a sculpted concrete cornice, and incorporates strongly articulated precast concrete elements (g - h)

Much original signage, especially to the eastern and southern elevations, survives. The unusual repetition of 4 illuminated 1970's style roundels is unique (i)

Integral landscaping in the form of raised beds, in brown brick and precast high-relief pyramid-pattern flag paving, to the eastern and southern façades (j - k)

ENTRANCE LOBBY

Entered through glazed sides from the north (bus station) and south (street). Large, lofty space dominated by the atrium that features a glazed pitched roof, supported by girders finished in blue. Supporting columns form obvious features as does the landscaped area. The entrance to the ticket office forms the western elevation, that to the east opposite partially filled by a retail unit. Plain concrete and ceramic slab finishes in browns and cream predominate, offset by a white ceiling and slab flooring (a - c)

'London Transport' travel information boards to west wall; 5 no. hanging-basket brackets with roundel motif; 4 no. door handles shaped as half-roundels resited to glass doors to ticket hall (d - f)

TICKET HALL

Low oblong space, orientated east-west, with UTS suite to northern elevation and vertical glazed windows to south

Finishes: granolithic compound floors. White perforated metal cladding panels to ceiling, with integral lighting. Walls predominantly clad in beige, offset by orange and brown (a- c)

Vertical slit windows to south elevation especially noteworthy for their use of orange melamine jambs (b - d)

Labyrinth artwork (267/270)

LOBBY AND STAIRCASES

Continuation of the ticket hall, leading to open staircases, with an intermediate landing, giving access to sub-surface platforms.

Flooring in granolithic compound. Walls, predominately in beige ceramic tiling, offset with chocolate brown, and with orange mosaic tiles used at the soffits of the portal onto the platforms lobby. Double staircase with varnished timber panel to headwall; attractive stainless steel handrails. (a - f)

PLATFORMS

Island platform, with accommodation block situated towards the western end.

'Canopy': a curved, exaggerated 'gull wing' canopy dominates, this springing from a central rib that is in turn supported by a series of columns, the inner edges of which turn to match the rib profile. The outer edge of this structure, above the platform edge, carries integral lighting. The canopy is finished in perforated metal slats, in white, that match the black slats above track. The columns are finished in green ceramic tiles, with edging, and the flanks are in orange tesserae inset with 'Speedbird' motifs. Staff letter boxes (2 no.) set either face of end column (a - f)

Figure 11. TfL Heritage Railway Features document - Hatton Cross

HATTON CROSS STATION
HERITAGE FEATURES IN DETAIL

PLATFORMS

Accommodation block and staircase flanks: finished in vertically aligned ceramic tiles, green predominating, inset with highlighted poster panel positions. The walls are inset with brushed metal sections, detailed, that contain backlit illuminated roundels. Some doors retain the original deep brown melamine finishes (g - k)

Trackside walls feature square profile beige ceramic tiles, with inset poster position panels (l)

PLATFORMS

General finishes and signage: floor is set in brown-flecked granolithic flooring compound (m) that has, in places, been patch repaired in plain concrete skim. Some original signage survives but later additions are to later style.

The brushed stainless steel metal edging and finishing used throughout the station, are also used in the fire equipment cases (n)

Figure 12. TfL Heritage Railway Features document - Hatton Cross

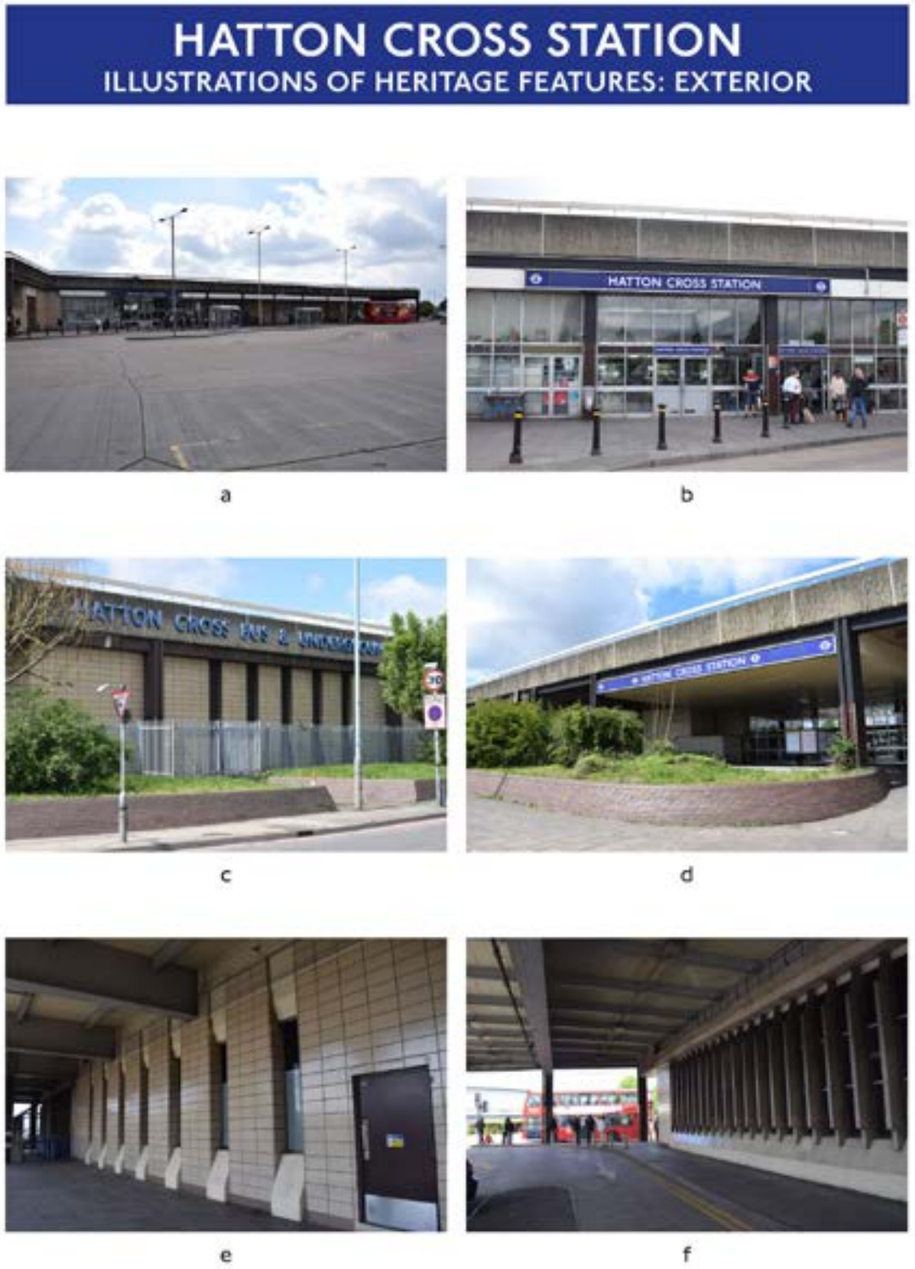

Figure 13. TfL Heritage Railway Features document - Hatton Cross

Figure 14. TfL Heritage Railway Features document - Hatton Cross

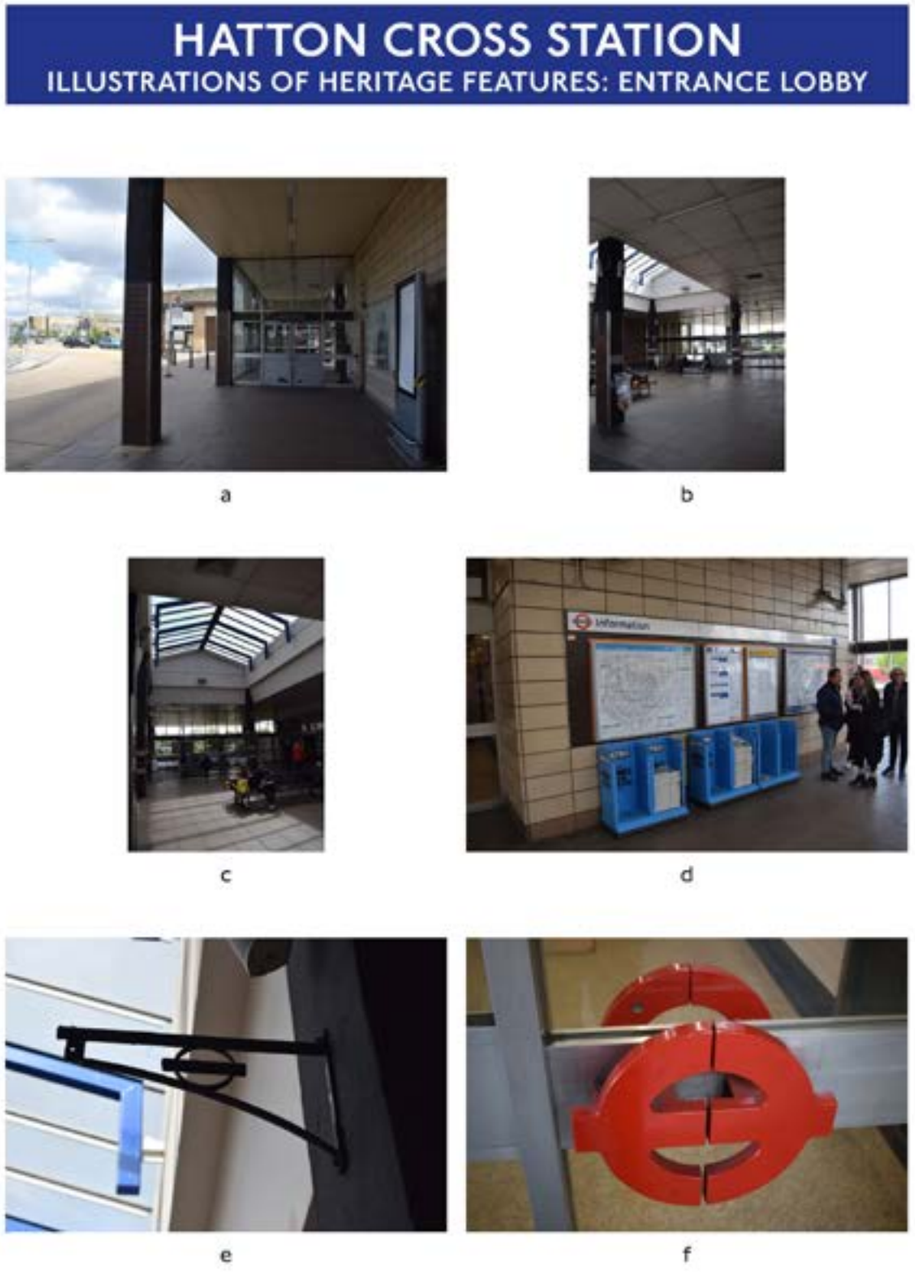

Figure 15. TfL Heritage Railway Features document - Hatton Cross

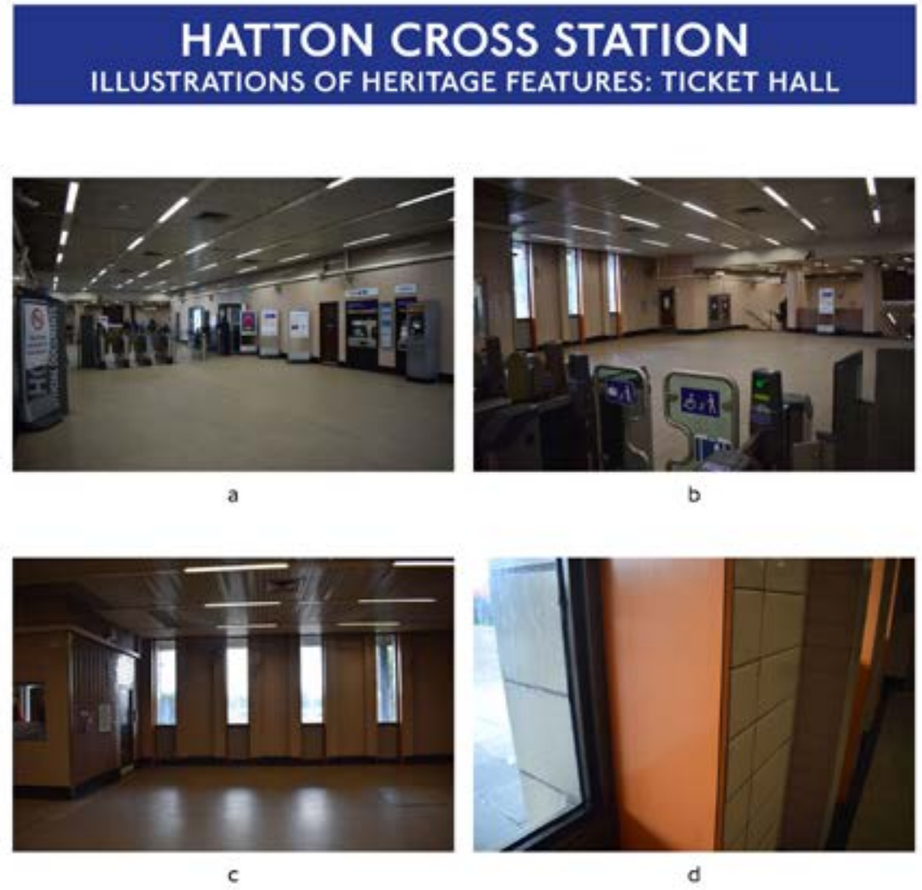

Figure 16. TfL Heritage Railway Features document - Hatton Cross

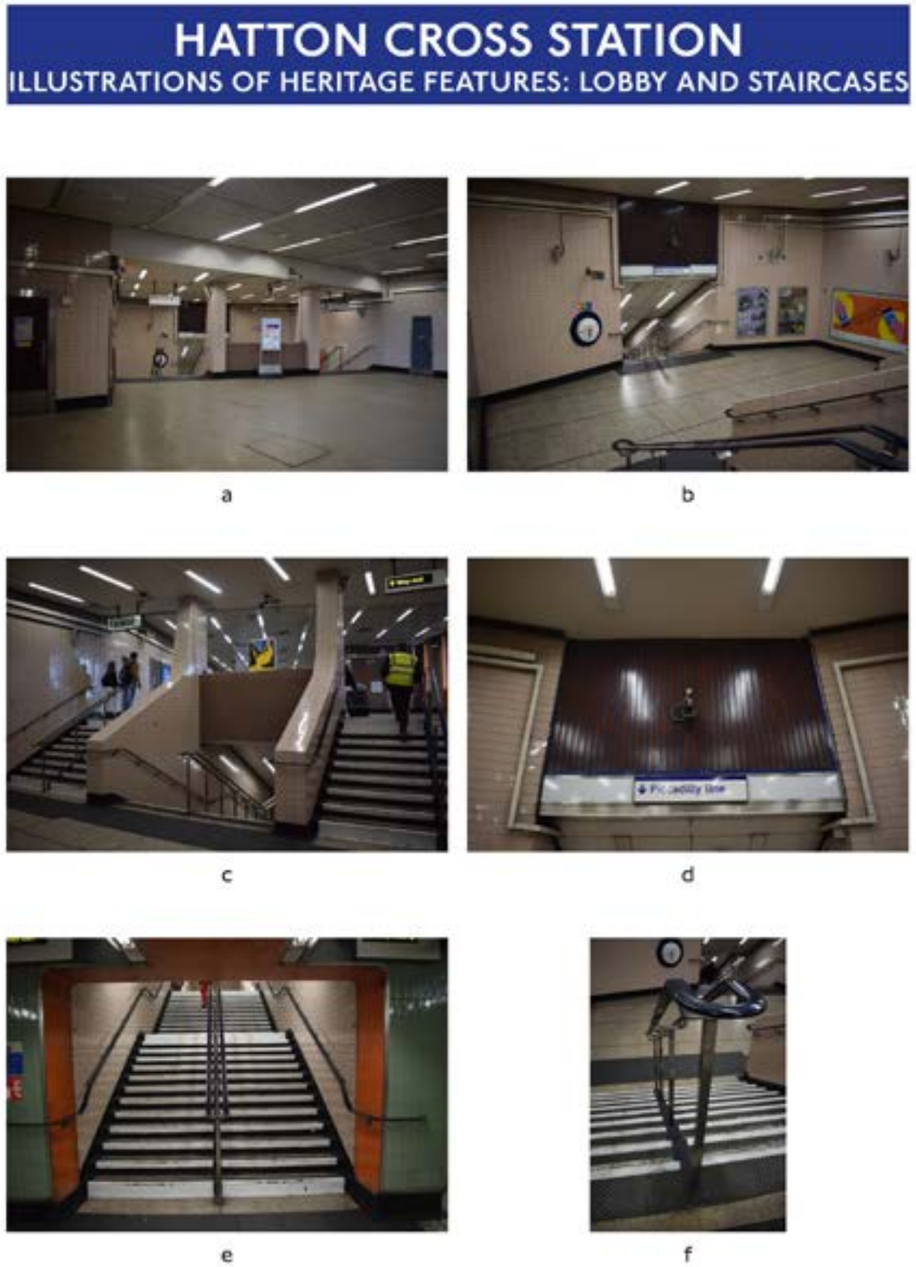

Figure 17. TfL Heritage Railway Features document - Hatton Cross

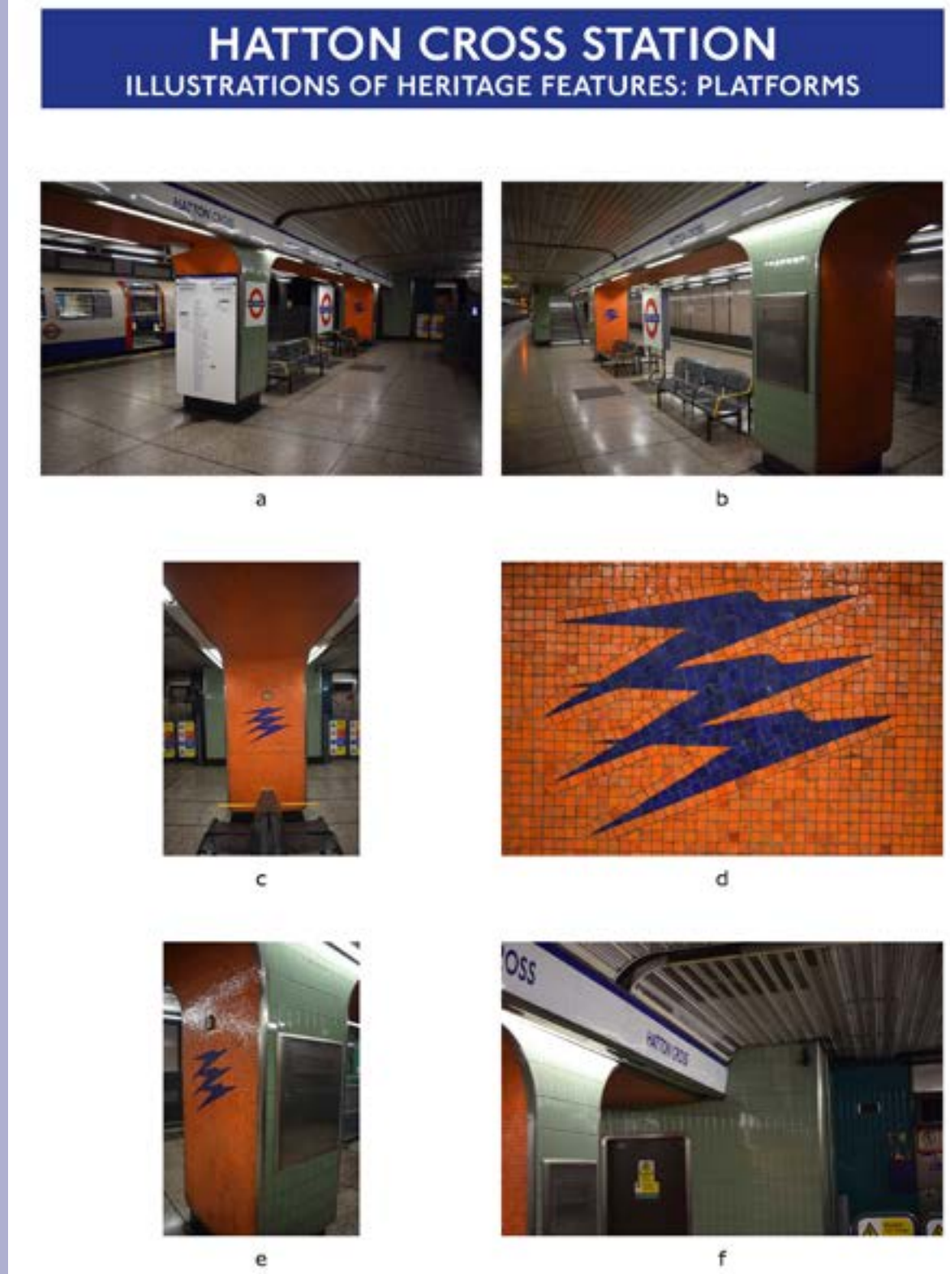

Figure 18. TfL Heritage Railway Features document - Hatton Cross

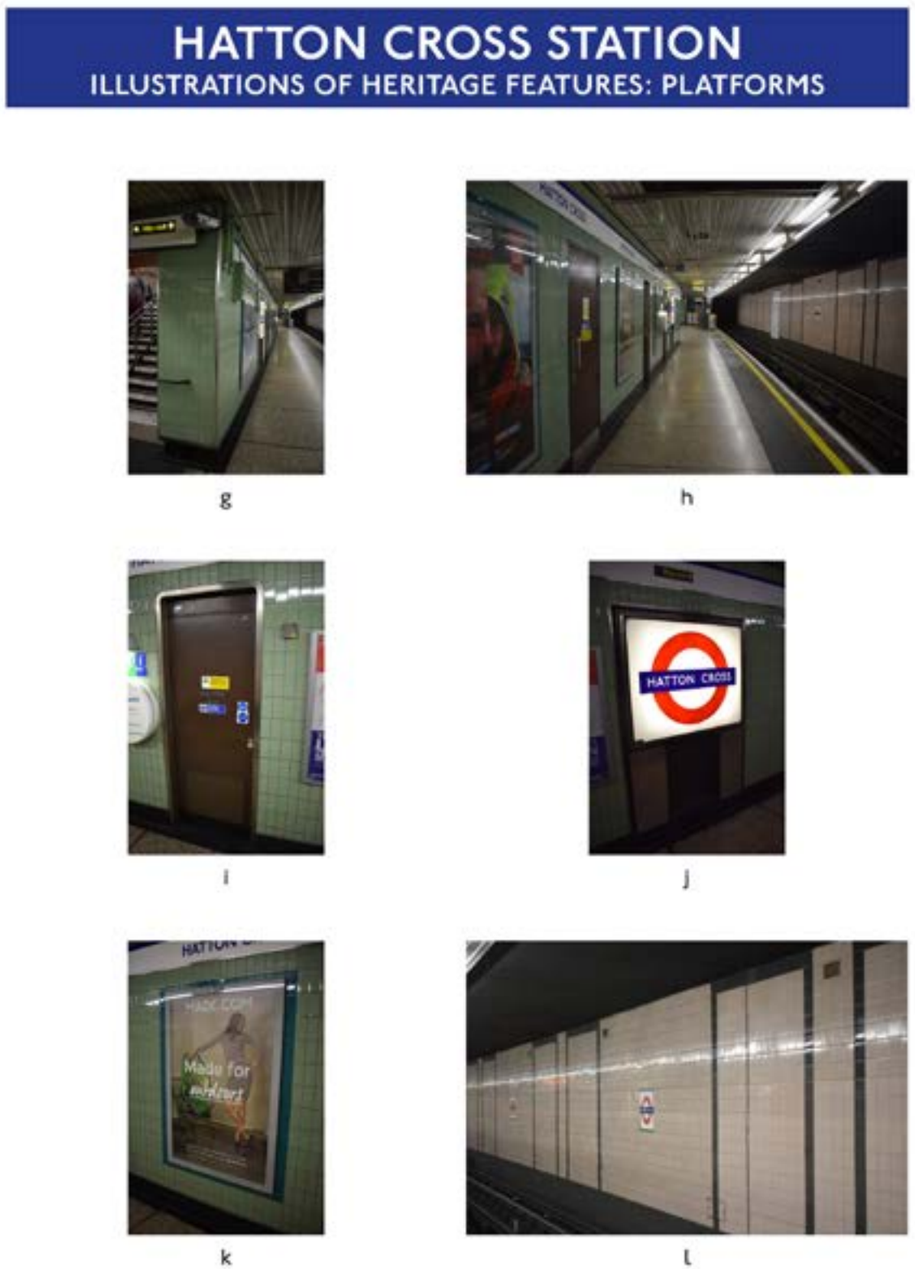

Figure 19. TfL Heritage Railway Features document - Hatton Cross

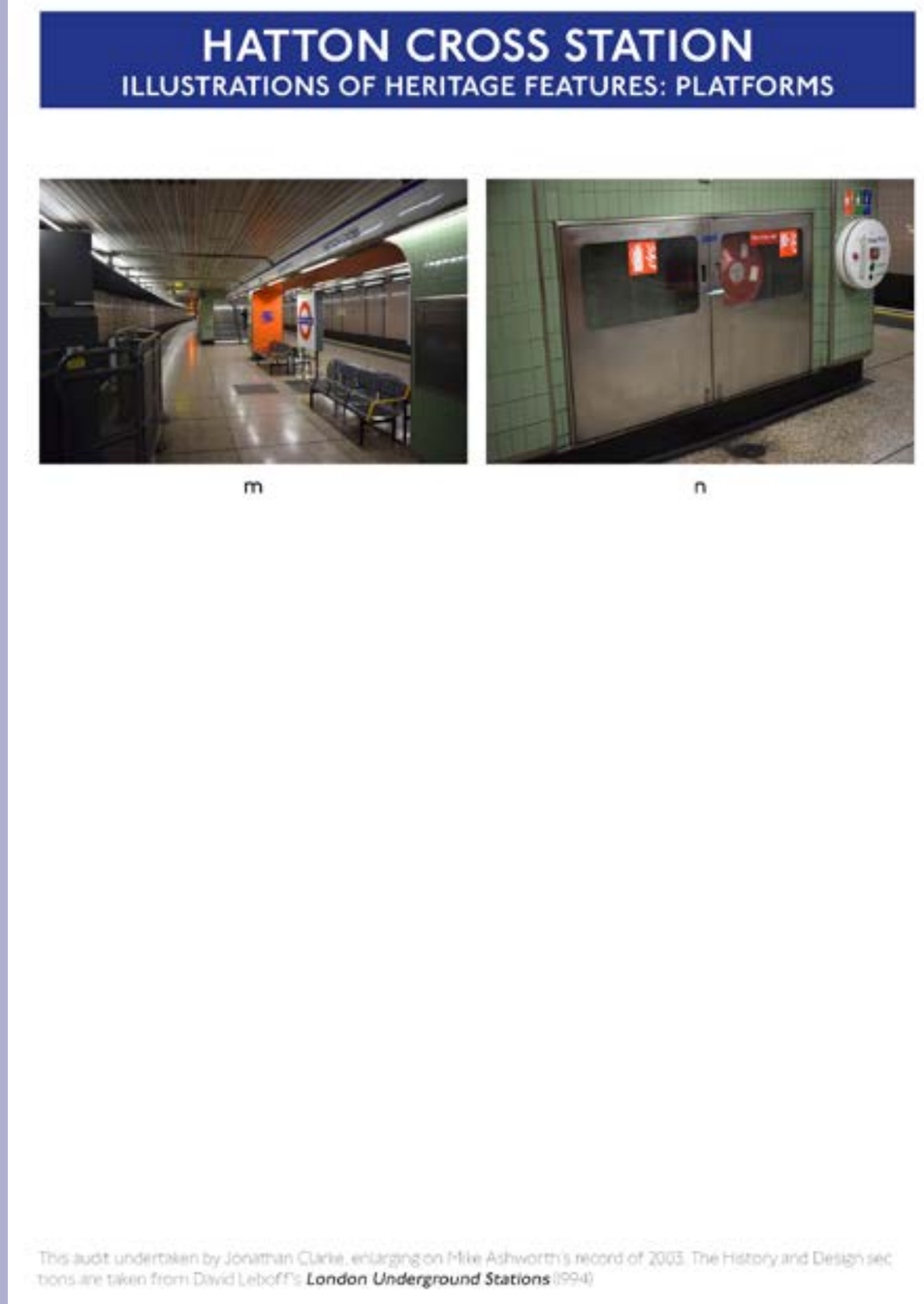

Figure 20. TfL Heritage Railway Features document - Hatton Cross

Figure 21. North-west elevation signage

Figure 22. External colour and texture

Figure 23. Glazed block colour and texture, with obvious graffiti damage

Figure 24. Internal view of the substation

Figure 25. Interior view towards the mezzanine

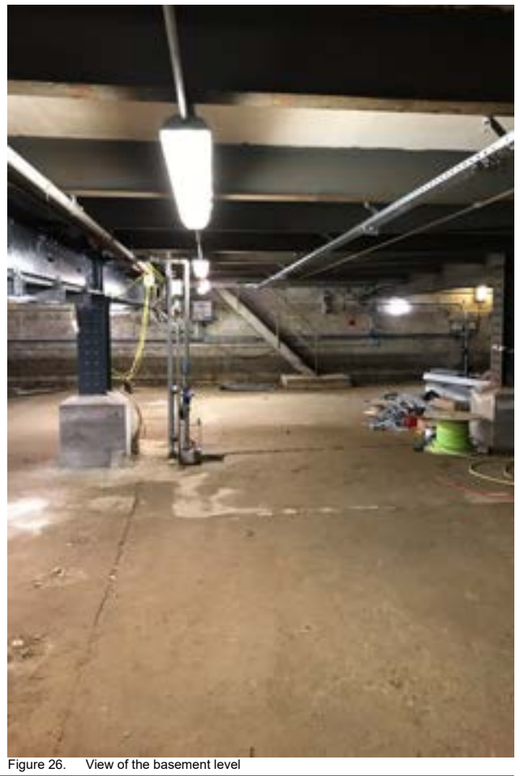

Figure 26. View of the basement level

Figure 27. View of western side of the station

Figure 28. View towards bus station

3. Design

The current Hatton Cross substation footprint is at capacity and does not have adequate space to implement a full substation upgrade. The substation footprint will need to be extended to enable the upgrade works to proceed. The proposed extension to the existing substation is the logical choice and poses the least disruption to the London Underground station and bus interchange operations.

3.1. Proposed works

As part of the PLU programme, the Hatton Cross station site proposed scheme comprises a combined single storey substation extension and Signalling Equipment Room (SER) building; the proposal is lower in height than the existing station concrete frieze band.

The proposed substation extension will be accessed via existing entrances and the proposed SER building will introduce new entrances. Proposed works to the existing Hatton Cross substation building include:

3.1.1. Demolition works

- Partial demolition of the eastern elevation louvred and glazed block tiled wall to enable the proposed extension and equipment installation.
- Removal of suspended ceiling panels including those damaged (this includes those containing asbestos).
- Partial removal of existing east elevation metal fence and upstand brickwork wall forming a boundary for external passage.

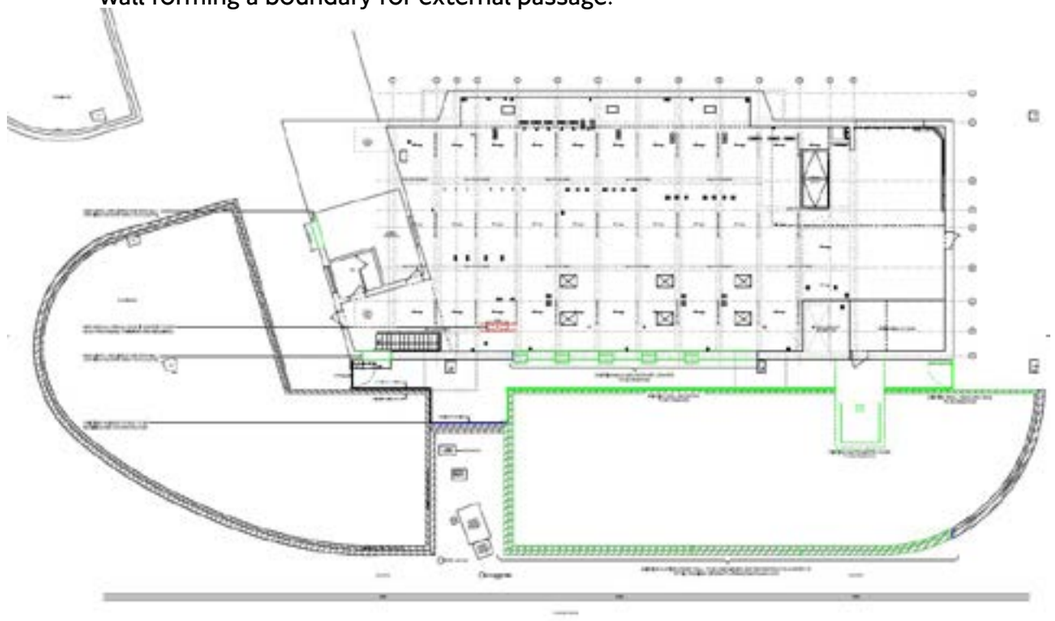

Figure 29. Demolition plan

3.1.2. Construction works

- The new extension will have insulated cavity walls, faced with a mechanically fixed glazed rain screen cladding block system secured to the structural concrete inner skin.

- The thermal performance of the proposed substation extension and the SER will be in line with current British standards, Building Regulations and TfL standards.

- A new internal metal staircase to access the mezzanine level will be installed, along with adequate fall protection to this area, with removable stanchions for equipment replacement.

- New louvres will be installed to the external elevations of the proposed building to match the existing style and colour – please refer to drawings for locations and dimensions

- A new external access ladder leading down from the existing station flat roof over the balustrade and down on the proposed raised non-slip finish paving and ballast substation extension and SER extensive blue roof will be installed. This ladder will be protected to prevent unauthorised access.

- Care will be taken during construction to ensure that all existing elements are kept in a satisfactory condition and repaired if required. Particular attention will be given to the external concrete cornice and 'Hatton Cross Station' metal lettering, which may have corroded fixings.

- New linear drainage to control rainwater run-off and reduce flooding will be installed to the ex-tension. Subsurface drainage will be routed into the existing drainage system.

- Appropriate statutory and mandatory signage.

- Making good all existing surfaces that interface with the proposed works.

- Deep cleaning to the existing adjacent cladding, soffit and paved flooring.

3.1.3. Envelope

- Provide insulated brick slip-fronted cavity wall construction building wrapped around a rein-forced concrete inner wall. External envelope appearance and colour to be in keeping with the existing station materials and colours. LRV (Light Reflectance Value) colour contrast between door and ironmongery to align with TfL Doors and Premises standards also Building Regulations Approved Document M.

- Introduce new doors and security louvres with fire dampeners to their rear.

3.1.4. Security / walls (external low level)

- The internal reinforced concrete wall, floors and roof will provide security protection against accidental vehicle collision.

3.1.5. Roof

- Hooped access ladder leading up from the external walkway to the roof with lockable security anti-climb cover plate to the base. Non-slip finish walk platform bridging lowered parapet roof section at high level.

- Blue roof system paved warm deck with downpipes and stormwater overflows must be out-bound of the internal Substation Room building volume. The rainwater downpipes and hopper serving overflow pipes are to drop down and feed into the existing drainage system.

- Folded metal parapet cap flashing with bird deterrent solution blunt uprights and wires.

- Integrate a lightning protection isolation system.

3.1.6. Security / Deterrent (high level)

- Installation of statutory mandatory signage including asset labelling. This includes warning signage to deter climbing and walking or standing on certain building elements.

3.2. Proposed landscaping

Planting additional trees around the car park is intended to create a colourful tree lined buffer between the Great South West Road and Heathrow Airport.

Trees species considered:

- Liquidambar styraciflua *Slender Silhouette*
- Acer campestre *Streetwise*
- Ulmus 'New Horizon'

3.3. Other options considered

Alternative locations and options for the extension were considered, as shown below:

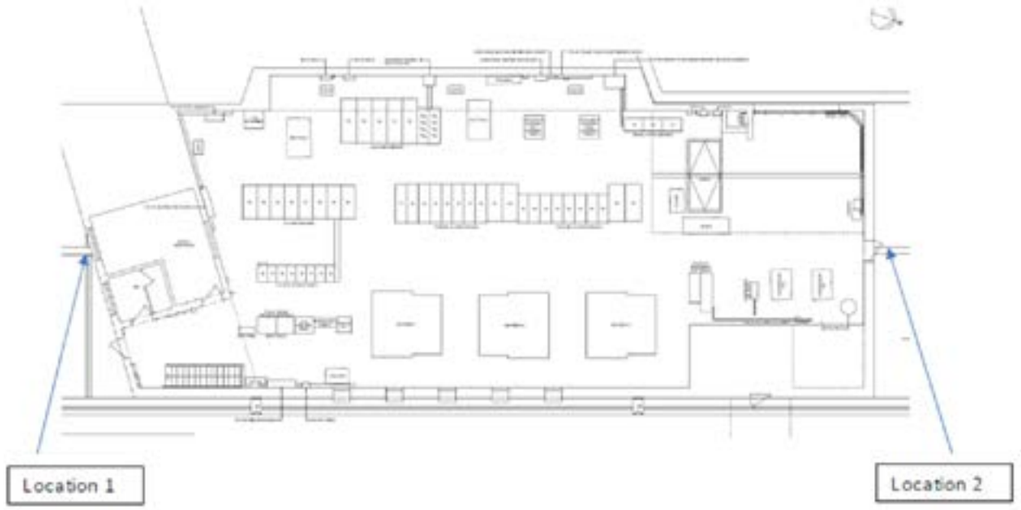

Figure 30. Possible locations for the substation extension

3.3.1. Location 1

The area would have been too large to accommodate the new substation rectifiers and auxiliary substations. In addition to this, the area lies immediately above the Piccadilly line tunnels which are approximately 1.9 meters below the ground level; this is too shallow. The area next to the mess room is occupied by the station Distribution Network Operator (DNO) supply, which would require relocation. This would have been further complicated by cabling routing and access requirements.

3.3.2. Location 2

The area is clear of the Piccadilly line running tunnels but there is a covered walkway to the bus station and taxi rank alongside, which meant that the full width of the substation would not be available for extension without significantly altering the bus station turning zone; including the size and location of the taxi rank. When attempting to layout the new equipment in the area that this extension offered, it was found to not be sufficiently large to accommodate the new equipment. As happens for location 1 above, there is no direct access to the cable basement which does not extend below the full area of the first floor. Cabling would have been very difficult in this area. For this reason, the location 2 option was rejected.

Other alternate Hatton Cross substation extension and SER proposed options considered:

3.3.3. Station flat roof

British Airports Authority (BAA) & British Transport Police (BTP) were against this option, due to the aeroplane flight paths and working on the existing roof causing

security concerns. The Hatton Cross station is along the royalty road route to Windsor (before the passing of Queen Elizabeth II), security was concerned with TfL staff and operatives' unrestricted access to the roof.

3.3.4. Splitting the Rectifier in 2 (Substation outside/ Rectifier inside)

Option considered with half of the high voltage and low voltage electrical equipment outside and the other half inside; this option did not leave the required functional space inside the substation.

3.3.5. Extending the Basement

This was ruled out, as there was a high risk that excavating into the basement would clash with either the running tunnel or part of the station structure.

3.3.6. Rectifiers in the Car Park

Placing rectifiers in the car park on the other side of the station would pose a security risk and the services cabling routing travel distance would present other undesirable issues.

4. Use

As this is an extension to the existing substation located on operational railway land, the general use of the station and substation will remain as they are at present. Hatton Cross is a signalling points and crossings-controlled site for the Piccadilly Line. This site is essential to the operation of the current and new signalling system, which requires the existing interlocking machine room to be replaced with a new Signalling Equipment Room (SER) to support GoA2 to GoA4 operation and a timetables service of up to 36TPH (trains per hour). The construction of a shell of a room for the future SER is included within the scope as the project was steered towards a joint planning application process as advised by the TfL's Town Planning and Heritage team. The design considers the current problems of loitering and fly-tipping areas around the station and aims to remove them by design.

5. Massing and scale

The new construction has an area of 205m² and a maximum height of 5.9m above ground floor level, including the handrail. The height of the building is defined by the requirements of the substation and SER equipment. However, it is lower than the existing station concrete frieze band, to be perceived as an addition to the original design that is in-keeping with its architectural language but clearly from a different decade, and also so that it doesn't disturb the continuity of the perimeter beam and cornice with signage, as they unify the whole site and provide a very clear design intention. The scale of this building is subdued to the main building and does not aim to compete with the landmark status of the station or alter the perception of the main volume.

Figure 31. Existing view of the north-west elevation

Figure 32. Proposed view of the north-west elevation showing the new volume

Figure 34. View of the new volume from Faggs road

6. Layout

As set out in section 3.1 and 3.3 above, the layout of the new extension took into account the area required in relation to the area available, and the relation to the existing substation, track and other site constraints. This is meant to be a small addition to a rather large building and as such not have a huge presence in the area. The reduction in greenery will be somewhat compensated by the landscaping of the overall station and green strip along the Great South West Road, as detailed in section 3.2.

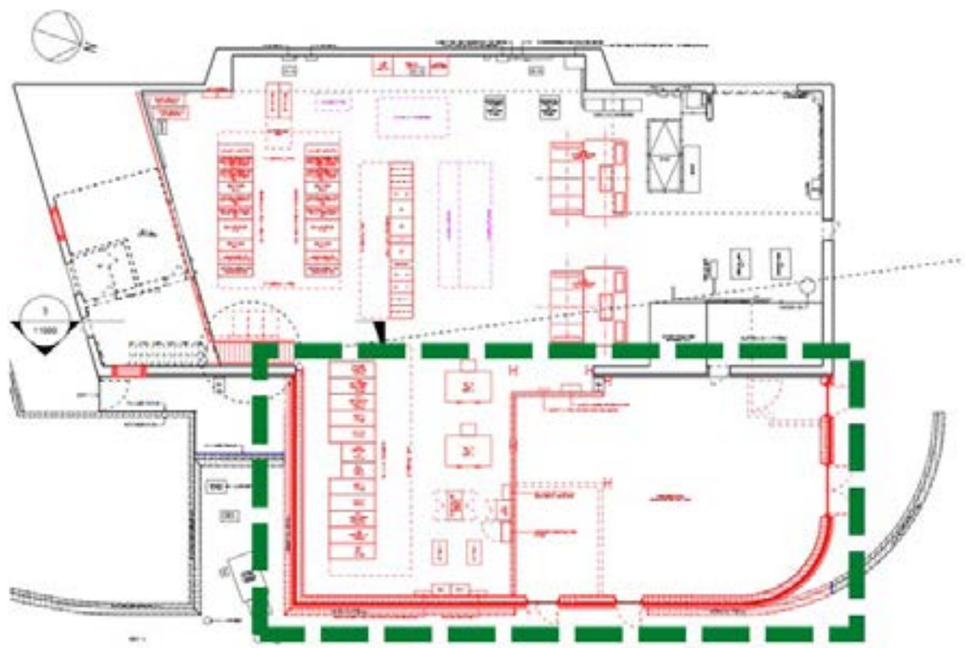

Figure 33. Proposed layout of extension

7. Appearance

7.1. Walls and Soffits / Finishes

Where the new construction adjoins the existing substation external wall, the wall finish is to remain as is and will be cleaned and any damaged areas repaired. Particular attention will be given to the external concrete cornice and metal lettering, which may have corroded/ worn fixings – these will be assessed and repaired if they present a hazard.

The proposed extension external wall finish is mechanically fixed brick slip cladding, with a colour and finish to match the existing. The cladding will be similar in appearance and texture to that of the existing glazed blocks, but the proportions will be slightly different, to create a subtle distinction between the original design and the extension. This cladding will be protected against graffiti to a height of about 2.5m. The external face of the proposed Hatton Cross substation extension wall will not project further than the top of the existing dwarf wall and line up with the top of the brickwork upstand. Movement joints will be incorporated where required without compromising a consistent external appearance. The proposed wall finish will be fixed to the supporting structure utilising a proprietary system and will be faceted where the wall is curved, in such a way that the faceting is inconspicuous. The connection between the two buildings will be carefully detailed to allow independent movement but maintain a watertight joint. Decorative glass-reinforced concrete lintels are to be installed above the doors, to match the appearance of the existing lintels in with colour and texture.

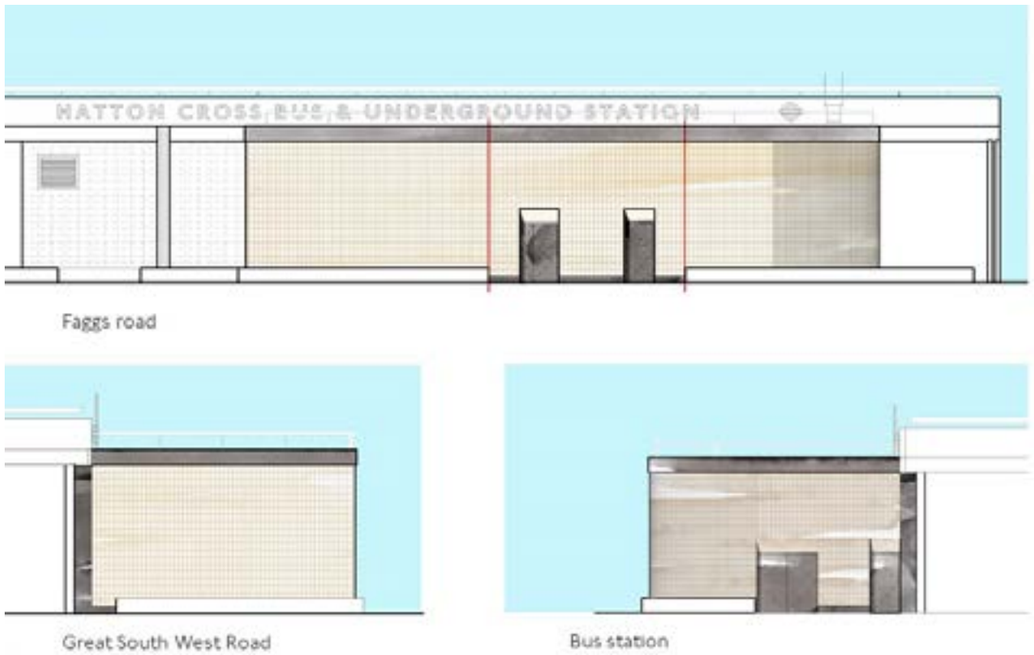

Figure 35. Proposed elevations of extension

Internal and external wall construction are required to accommodate vibrations from passing trains beneath. Proposed external doors, while constructed in a different material than existing ones (steel rather than timber), will match the existing in colour.

7.2. Floors

New external concrete floor will provide a finished wearing surface that accepts traffic without further treatment. The internal floor surface before the threshold of the final exit doors is required to grade towards these doors to reduce potential water ingress and prevent water ponding. Internal finishes will in line with London Underground standards for robustness, visual contrast and anti-slip properties.

The ground structural slab is to be finished with a granolithic levelling and wearing screed, to provide a suitable walking surface that is free of trip hazards. The screed should provide a finished wearing surface that accepts traffic without further treatments and complies with LUL's slip resistance requirements.

All steps/ changes in level will be demarcated with a durable high visibility non-slip paint. Appropriate signage is to be provided where required.

7.3. Roof

A blue roof system layout with gravity drainage system and overflow will be installed in the new extension. Downpipes are integrated in the external wall design and should sit flush with the wall finish.

Parapet design with pre-formed metal capping flashing, Polyester Powder Coating (PPC) to align with the existing high level perimeter beam colour. Small shadow gaps will be created at the joints between existing and new, to differentiate between the two and create a more pleasing junction.

7.3.1. Roof level balustrade

As the roof requires occasional access for inspection and maintenance, a balustrade must be provided at high level. This should not detract from the cornice and lettering on the existing building, and as such is designed to minimise visual impact.

7.3.2. Bird deterrent measures

Where applicable, non-aggressive bird deterrent systems to include a suspended tensioned bird wire system, which must not cause physical harm to birds, or create any sort of visual pollution.

7.4. External ladders

The scheme proposes the installation of hooped ladders providing access and also a means of escape from the proposed roof.

- The design of the fixed hooped ladders to receive a galvanized finish

- Lockable and removable security anti-climb ladder guard to the base of ladders.

Please refer to drawings for the location and dimensions of these.

7.5. Collision protection

The existing engineering brick dwarf wall and planters serve as collision protection to the station building. This proposed substation extension and SER would provide protection against accidental vehicular collisions by providing a pitched engineering brick base and reinforced concrete wall substructure.

The external engineering brickwork pitched base will, as far as is practicable, re-use the existing bricks (if they are not damaged in the demolition process). If new bricks are required, they will match the existing in size and appearance.

7.6. Louvres

- The colour of louvre, flashing and sill to match parapet folded metal capping. Intumescent mastic colour to match the existing louvres colour.

- The proposed (PPC) louvres will be mechanically fixed internally; anti-vibration and anti-tamper fixings will be installed to mitigate any noise from the substation. All exposed visible public-facing fixings colour is required to match the asset secured.

- Louvres are required to have insect mesh to their rear, consideration is required to ensure the project louvre ventilation-free area requirements are met.

- Openings are to be set out to brick slip coursing to reduce cutting and optimise the external envelope aesthetic. Please refer to drawings for location and size.

7.7. Signage

Adequate signage must be provided for the building, highlighting any hazards, safe conditions, fire escape and any other relevant information.

7.8. Design and Service life

The design life of the Substation and Signalling Equipment Room (SER) project, Civils building structure is a minimum 120 years as LU standard S1915. The design life of the works shall be in accordance with BS ISO 15686: Part 1 or as otherwise defined within the Subcontract Work Information.

7.8.1. Lightning Protection

Lightning protection design (see Lightning Protection Standard BS EN 62305 and Code of practice for protective earthing of electrical installations BS 7430) / routing

design by Contractor and is to be concealed from the public; lightning protection running along parapet capping flashing fixing must not penetrate capping. A lighting protection risk assessment will be carried out by the designer to determine if lighting protection is required.

8. Planning consents and archaeology

The Hatton Cross substation extension and new SER building scheme falls within our Part 18, Class A Permitted Development rights detailed in the Town and Country Planning (General Permitted Development)(England) Order 2015.

TfL has powers under the London Transport Act 1967 that approved the initial extension of the Piccadilly line to Hatton Cross and while this station has at present no heritage designation, TfL recognises the Hatton Cross station architectural interest as a 1970s brutalist building and works will be sensitive to its original design.

The proposed extension has been carefully designed along the east elevation to be lower in height than the textured concrete frieze of the existing 1976 station building.

8.1. Archaeology

The Hatton Cross station resides within Hillingdon's archaeology Heathrow area (reference APZ) with potential prehistoric classification era artefacts. No archaeological artefacts are expected to be found within the previously excavated and proposed construction extension site; however, caution will be taken with the groundworks.

8.2. Planning History

No relevant planning history associated with the east elevation of the Hatton Cross station property is on record.

8.3. Planning Permission

The proposed substation extension and SER proposal scheme works fall under Permitted Development rights. Nevertheless, the local planning authorities will be consulted and the proposal presented for feedback and Prior Approval.

8.4. Identified constraints

We have identified no major issues, including TPOs, access, security, drainage, materiality, detailing, solar path, or any overshadowing including overlooking neighbours' property with the proposal and maintenance.

- We foresee no planning constraints

- There will be no increase in parking or traffic

- The extension will comply with Building Regulations

- There will be no change in access to the existing train station and bus interchange station

- The proposal poses no additional flood risk. Sustainable Drainage Systems (SuDS) will be introduced

- No additional noise pollution beyond the construction sequence.

- The proposal supplants more trees and vegetation than the non-TPO trees outlined for removal

- The proposal will not restrict neighbours' views and has no windows overlooking neighbouring properties

- There will be no direct light or indirect light overshadowing neighbouring properties

- The proposed extension will improve station security (Secure by Design) and reduce dead spots (discouraging fly-tipping, deterring undesirable social behaviour and loitering), by introducing SER access points to the west elevation.

- The extended substation proposal will have internal public health amenities for staff members.

9. Social and Economic considerations and benefits

9.1. Social

- Upgrading the Piccadilly line stations and train stock is appealing to business development and families to relocate closer to these hubs. Hillingdon borough project population growth of 16.1% between 2014 – 2024 (modgov.hillingdon.gov.uk/documents/s38278/Annex%201.pdf), with an expected 340,000 by 2024. Transport investment has a correlation with economic growth.

- Improving reliability and safety: Upgrading the substation and adding a Signalling Equipment Room (SER) will improve the reliability and safety of the rail network, reducing delays and improving passenger satisfaction.

- Increasing frequency correlates to increased capacity: The upgrades will increase the capacity of the rail network, enabling more passengers to travel safely and efficiently.

- Employment opportunities and job creation: The PLU upgrades can create jobs in the construction, engineering, and maintenance sectors, helping to support local economies and provide employment opportunities.

9.2. Economic

The Piccadilly Line Upgrade (PLU) programme is expected to be a catalyst for additional development. There have been some recent hotel and restaurant refurbishment projects in the Hatton Cross and Hillingdon borough area.

- Increased investment: Upgrades to infrastructure can attract investment from businesses and investors, contributing to economic growth and development.

- Improved productivity: A reliable and efficient TfL network can help to improve productivity by reducing the time and cost of transportation for businesses and individuals.

- Increased property values: Upgrades to infrastructure can help to increase property values in the surrounding area, benefiting homeowners and the local economy.

10. Environmental considerations

Hatton Cross station is positioned on the Heathrow Airport aeroplane flight path. The existing flat roof and proposed substation extension and SER are not considered suitable for an extensive green roof. However, the Hatton Cross station main flat roof is earmarked as one of many potential flat roofs suitable for (PV) Photovoltaic systems.

All equipment to be installed must meet the limit for noise emission specified in the appropriate LU specification for the equipment (not more than 65 dB(A) at Im from the equipment).

Noise during the construction phase will be monitored and managed to meet the baseline acoustic assessment to be carried out during the detailed design stage. This will be done before the construction project begins. Forecast non-compliance issues must be discussed with TfL before the commencement of staged works to reduce impact and/ or gain Section 61 of the Control of Pollution Act consent.

- Acoustic performance of the external envelope, soffit, internal walls and doors at the Hatton Cross substation extension and SER building, shall be designed to ensure the noise levels within all internal spaces are below both the action levels and limit values defined in Control of Noise at Work Regulations 2005.

- Reducing emissions: a more efficient TfL network can help to reduce emissions from cars and trucks, contributing to improved air quality and reduced greenhouse gas and pollutant emissions.

- Reducing congestion on roads: a more efficient rail network can help to reduce congestion on roads, reducing the need for new road construction and supporting sustainable urban development. A reduction in road traffic reduces noise pollution improving the quality of life for residents and workers in the surrounding area.

- Reduce transport-emitted noise and vibration pollution: upgrading the train stock will reduce the noise from wheels against the tracks and provide a more comfortable experience for customers.

10.1. Sustainability

Improving resource use and waste management (TfL signed up to the GLA

Responsible Procurement Policy in March 2006): To improve the environmental profile of materials utilised, improve the utilisation of sustainable and low carbon materials, apply TfL principles of reduce, reuse and recycle.

As much as possible of the existing building will be maintained, with care not to touch the high-level pre-cast concrete textured frieze panel horizontal band. The existing signage on the east elevation will be assessed for oxidation and treated if necessary. Acceptable quality existing glass tiles will be reclaimed for reuse where tiles have been damaged.

The proposed extension building element is designed to achieve a minimum 50-year life span with minimal maintenance. UK-sourced products with recycled content will be used to coincide with TfL's drive to decarbonise the network. The approved Contractor will be part of the Considerate Contractor Scheme and have a strong track record for recycling.

10.2. Site Flood Risk Assessment

The site flood risk assessment has been carried out by TfL and the substation extension and SER scheme will not increase the flood risk as site lies within flood zone 1 and so has a low probability of flooding from rivers and the sea.

11. Access

Access to the building and its surroundings does not change with the construction of the extension. The substation access remains unchanged, and the access to the SER is to be level from Faggs road, and is to be utilised by authorised personnel only.