Appendix F

Condition & Feasibility Study

SWECO

Condition & Feasibility Study

125 Shaftesbury Avenue

Pre-Application Review

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Contents

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Executive Summary

1.1 Executive Summary

This report has set out the findings of the Condition & Feasibility Study conducted by Sweco UK for 125 Shaftesbury Avenue, focusing on the operation, materiality, and performance of the existing building. The content of this report has been set out to align with the requirement of London Borough of Camden's Energy Efficiency & Adaptability (EEA) CPG Chapter 9. The report has been informed by a significant level of survey and existing building information that has been gathered and reviewed as part of this study to provide an in-depth review of the insitu building at 125 Shaftesbury Avenue.

The key findings of this report can be summarised as follows:

- **Functional Operation:** There are some key functional operation issues of the existing building, such as differing levels of access and floorplates, the vehicle ramp and lack of accessible external spaces for building occupants. These are unlikely to require full demolition to resolve but would trigger necessary intervention.

- **Existing MEPH:** Existing MEP kit, while being relatively recently installed, does not meet modern low-energy performance standards, and includes significant quantities of high-GWP refrigerants such as R410a which are likely to be banned in the near future.

- **Existing MEPH:** The use of VRF systems limits any reuse/retention potential to a single manufacturer and the centralised AHU arrangement is sub-optimal for modern low-energy ventilation systems, which cannot be accommodated within the current massing due to their impact on NIA.

- **MEPH Service Life:** Existing MEPH equipment remaining service life is adequate, and a good proportion of the equipment could be considered for onward reuse.

- **Legislation:** The majority of EPCs are considered to be compliant with current regulations, but retail units may be non-compliant if MEES regulations change in 2025. The existing building has an under provision of cycle parking and facilities that do not meet current London Plan requirements, and an inability to improve this with the current spatial arrangement, particularly with the existence of the vehicle ramp at basement.

- **Material Inventory**: A significant quantity of the existing materials identified in the inventory report may be suitable for onwards reuse in the event of a more significant refurbishment/intervention, and exploration of these opportunities should be prioritised; the system for deploying the circular reuse strategy is already established and operational at 125 Shaftesbury Avenue with multiple systems under discussion.

- **Structure:** The existing concrete frame is robust and imposed design loads of the existing structure are higher than those that would be required under extant Eurocodes. The existing structure may facilitate retention & extension.

- **Spatial:** Internal floor to ceiling and slab-to-slab heights are variable and mostly sub-optimal for the modern office requirement but are within the acceptable BCO range for refurbishment. The quality of internal space is compromised by the narrow and inefficient floorplates.

- **Building Fabric:** Existing fabric performance is poor, and the façade is in poor condition. Recent window upgrades do not appear to have a made a significant difference to energy performance.

- **Energy:** The collated energy performance examples demonstrate that the interventions associated with the 2010s refurbishment did not improve energy efficiency in a significant way and suggests that more significant interventions are required to deliver energy performance that meets current expectations for market-leading sustainable developments.

On the basis of this report and its findings, it can be argued that a more significant intervention into the existing building is required to bring it up to a modern standard that achieves the multitude of regulatory, sustainability and operational requirements expected of a commercial office in London in 2024 and beyond. This is particularly associated with improving operational energy performance, where considerations of what best practice looks like have moved on considerably in the last 5 years, likely leaving the current building as a stranded asset, even with its more recent interventions. The operational energy findings justify this position. Overhaul and replacement of the compromised façade and MEP systems would support optimised performance.

However, the report also finds that there is potential for significant parts of the existing structure to be retained and reused in any new scheme. In addition, a number of the materials that may be stripped out in a more significant intervention are generally in good condition with some remaining service life, and therefore the deployment of the intensive assessment of identifying opportunities for onward reuse of items that cannot feasibly be reused on site, supported here by the digitalisation of opportunities by Material Index, will be key for wider decarbonisation and realisation of a meaningful circular economy strategy.

On this basis, a number of options were considered for this site, as set out in the DSDHA study included in Appendix B. This includes the relevant options as per the EEA CPG Chapter 9. This study also brings in wider considerations about the best use and design for the site, concluding that a retention and extension scheme offers the best overall outcome for 125 Shaftesbury Avenue.

Introduction & Context

2.1 Introduction & Purpose

This document sets out the findings of the Condition & Feasibility Study for the existing building at 125 Shaftesbury Avenue, to respond to the requirements set out in the London Borough of Camden (LBC) Energy Efficiency & Adaptability Camden Planning Guidance (EEA CPG) Chapter 9. This document is provided in response to a request from LBC's sustainability officer at the sustainability pre-app to provide further evidence of our workflows and analysis of the existing building ahead of the application for the new proposal for the site. Much of this work had taken place ahead of any decision to alter the existing building on site, and this report provides evidence of that.

This document therefore follows the sequencing of the condition and feasibility study requirements set out in paragraph 9.4 of the EEA CPG. Each query and line item is addressed in turn, with additional information added where necessary to provide further evidencing of existing building condition and feasibility for potential reuse.

It should be noted that the intent of the Applicant was never to embark on a process for justifying full demolition and redevelopment of the site at 125 Shaftesbury Avenue. Where possible, our core strategy is to reuse parts of the existing building wherever we can, particularly the structure, to support our approach of delivering a best-in-class futureproofed sustainable development in LBC that balances both operational energy use and embodied carbon considerations, alongside a broad range of other sustainability aspirations and principles.

The core sustainability aspirations of our proposals for 125 Shaftesbury Avenue include:

- Achieve market-leading energy performance for a commercial refurbishment.
- Target embodied carbon performance that demonstrates an improvement on the GLA 'Aspirational' benchmarks, focusing on reuse of existing structure.
- Demonstrate a marked improvement on urban greening and site biodiversity.
- Deliver significant improvements to building fabric compared to the existing condition, informed through detailed analysis.
- Deploy best-in-class 100% electric MEPH equipment to support low-energy operation during the building's life, including utilisation of on-floor ventilation and renewable energy systems.
- Reduce water consumption, manage surface water runoff and and deploy water recycling measures.

This report therefore aims to provide a more detailed review of the condition, compliance and materiality of the existing building at 125 Shaftesbury Avenue to inform decision-making on opportunities for retention and reuse, using the EEA CPG chapters as a guide for setting this out in a consistent way. Information has been gathered from a number of reports and surveys that have been commissioned and undertaken to assist in our understanding of the existing building and its particulars.

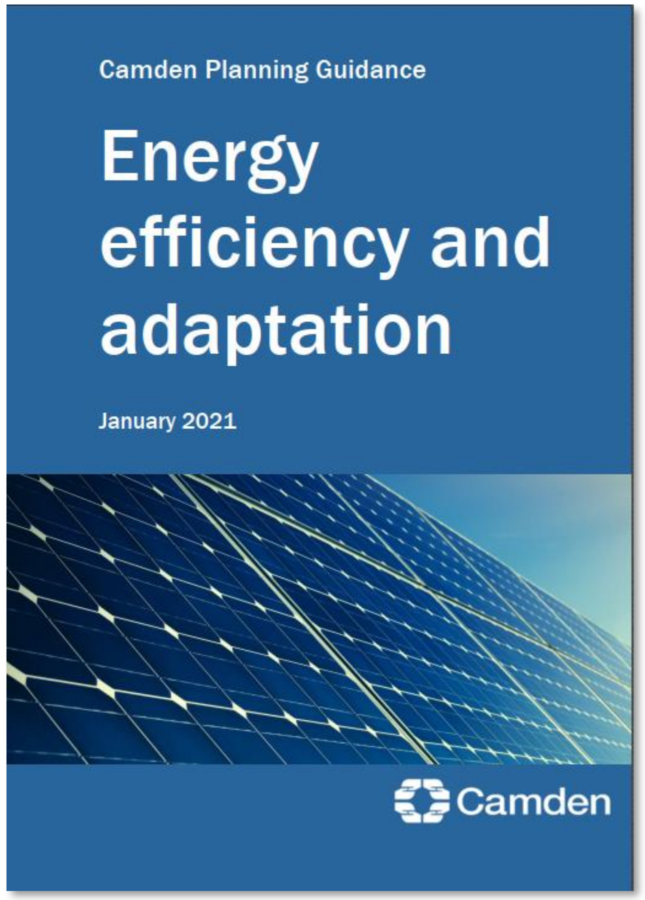
2.2 London Borough of Camden Policy

As noted in Section 2.1, the key review document for the Condition & Feasibility Study is the EEA CPG Chapter 9. Paragraph 9.4 of this document provides a list of key considerations to be addressed when considering the viability and opportunity for reuse and repurposing of an existing building. LBC note that:

"Retaining the resource value embedded in structures is one of the most significant actions you can take to reduce waste and material consumption."

The Condition & Feasibility Study requirement also links to Policy CC1 of the Camden Local Plan (2017), which states that LBC will require:

- All proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building.
- All developments to optimise resource efficiency.



Condition and feasibility studies (to understand the reuse potential of the existing building/s)	
Existing building uses	• How well does the building function? Identify operational positives/negatives. • Existing user surveys (if occupied) to understand what works / or doesn't work • If the building is not occupied have other options for reuse been explored?
Servicing	• Summary of MEP (Mechanical, Electrical, Plumbing) servicing, thermal performance and efficiency for each building component. • Identify remaining lifespan of plant and discuss pros/cons of plant upgrade.
Technical: review, with evidence and photos, of existing building, based on intrusive survey.	• Upgrades required to comply with current legislation • A material inventory audit, including an estimate of embodied carbon • Scaled section drawings showing slab depths, floor to ceiling dimensions etc. • Loading capacity of structural frame, materials strength, pile testing • Energy performance of the façade • SBEM (Simplified Building Energy Model) energy modelling • Details of Air Tightness, thermal bridge modelling and condensation analysis in exploration of limits to fabric upgrade in existing building • Future projections for carbon content of electric load should incorporate latest BEIS carbon factors
Site capacity	• What is the best use of the site? And can optimal site capacity be achieved?

LBC describe the potential benefits of prioritising reuse as follows:

- Reduces the requirement for virgin materials and therefore reduces its embodied carbon impact.
- Keeps products and materials at their highest value for as long as possible.
- Maintains heritage value.
- Minimises demolition waste.
- Reduces human disruption of extensive demolition and construction works, associated noise and transport impacts, and likely impact on air quality.
- Cost and programme savings, depending on the scope of refurbishment.
- Achieve BREEAM credits.

The intent of the Condition & Feasibility Study, and the key points set out by Camden in the table included in the EEA CPG Chapter 9 (paragraph 9.4) is to:

"Inform decision-making prior to the pre-application of a scheme [and] should provide a transparent and holistic approach to assessing options that delivers the best outcome".

This report therefore follows the key themes of the EEA CPG. Table 2.2.1 below provides a guide as to where the evidence for each section can be found within this report.

Table 2.2.1: table to show where key elements of the LBC EEA CPG Condition & Feasibility Study content requirements can be found within the sections of this report.

LBC EEA CPG Category	Where it can be found within this report
Existing Building Uses	Section 3
Servicing	Section 4
Technical & Site Capacity	Section 5

In addition to the qualitative and quantitative information provided within this report, the project team have also undertaken an assessment of potential options in line with EEA CPG paragraph 9.6, which considers the following options for reuse of the existing building and the potential constraints and opportunities of each:

- Refit
- Refurbish
- Substantial refurbishment & extension
- A comparative of the previous approval for the site from 2016/2017
- Reclaim and recycle (i.e., demolition & rebuild)

This additional study section was provided by project architect DSDHA and is included in **Appendix B** of this document. Further WLCA studies were conducted by Sweco UK but have not been included within this document at this time as we understood that there were not required as part of the Condition & feasibility Study workflows based on feedback received at the Sustainability pre-application meeting for 125 Shaftesbury Avenue in August 2024.

2.3 Draft New Camden Local Plan

In addition to the adopted policy documents, the Applicant is also aware that a Regulation 18 Draft (Consultation Version) of the New Camden Local Plan (January 2024) has been published and is available for review from Camden's website. The draft forms up some of the key policy positions and commitments from the 2017 Local Plan and EEA CPG, with a clear message of intent on sustainability.

We acknowledge that this is a consultation draft at the time of submission. However, it has been reviewed and assessed to determine how well the proposals align with the intent of this document.

Key policies relevant to this study include:

- Specific advice on demolition and expectation of any approach to justify (CC1, CC2)
- Policy introduction specific to circular economy (CC3)
- Introduction of minimum expectation for upfront embodied carbon (CC4)

Figure 2.3.1: Draft New Camden Local Plan

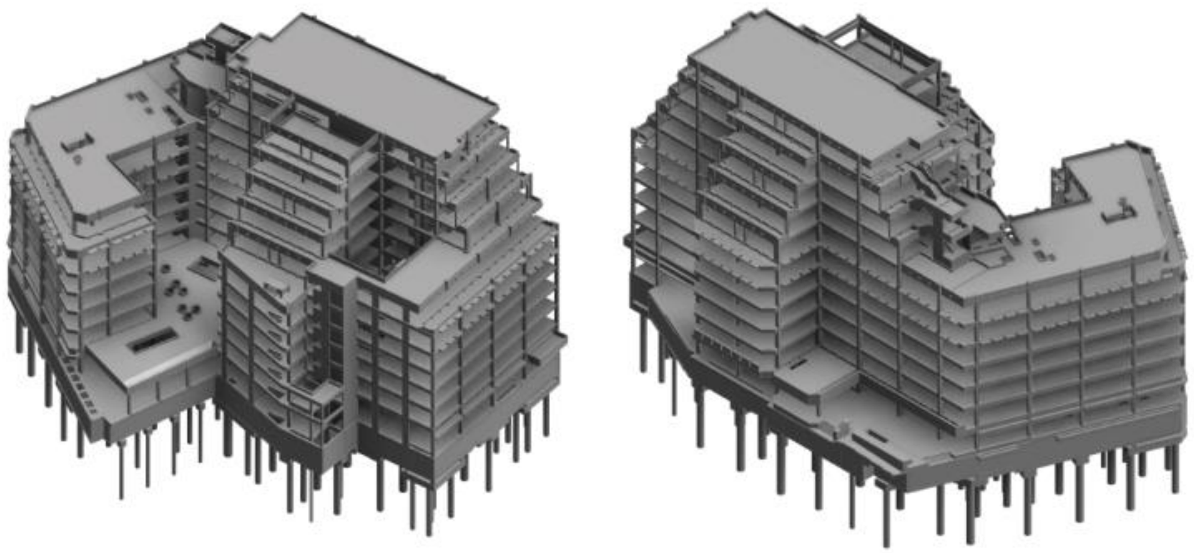
2.4 The Existing Building

This section provides a summary introduction to the existing Building at 125 Shaftesbury Avenue, noting that much of the key information and detail is covered within Sections 3-5 as per the requirements of the EEA CPG.

The existing building at 125 Shaftesbury Avenue was constructed in 1982 and is therefore c.42 years old at the time of writing this report. The current building use (and design intent of the original building) is a commercial office with retail across 1 level of basement, ground floor and 10 no. upper floors. It has an approximate floor area of 22,900 m^2 GIA, as verified by independent reporting from RICS surveyor Plowman Craven.

The existing structure of the building's primary frame is reinforced concrete, with slabs supported by RC columns and walls. Slabs are a mixture of RC flat slabs and ribbed infills of various dimensions, supported on band beams. There are two primary life safety and stair cores and two stair cores to the west of the site. Stability is provided by these cores, which are continuous to foundation and approximately 200mm thick.

Figure 2.4.1: axonometric images of the existing building structure (provided by structural engineer AKT II).

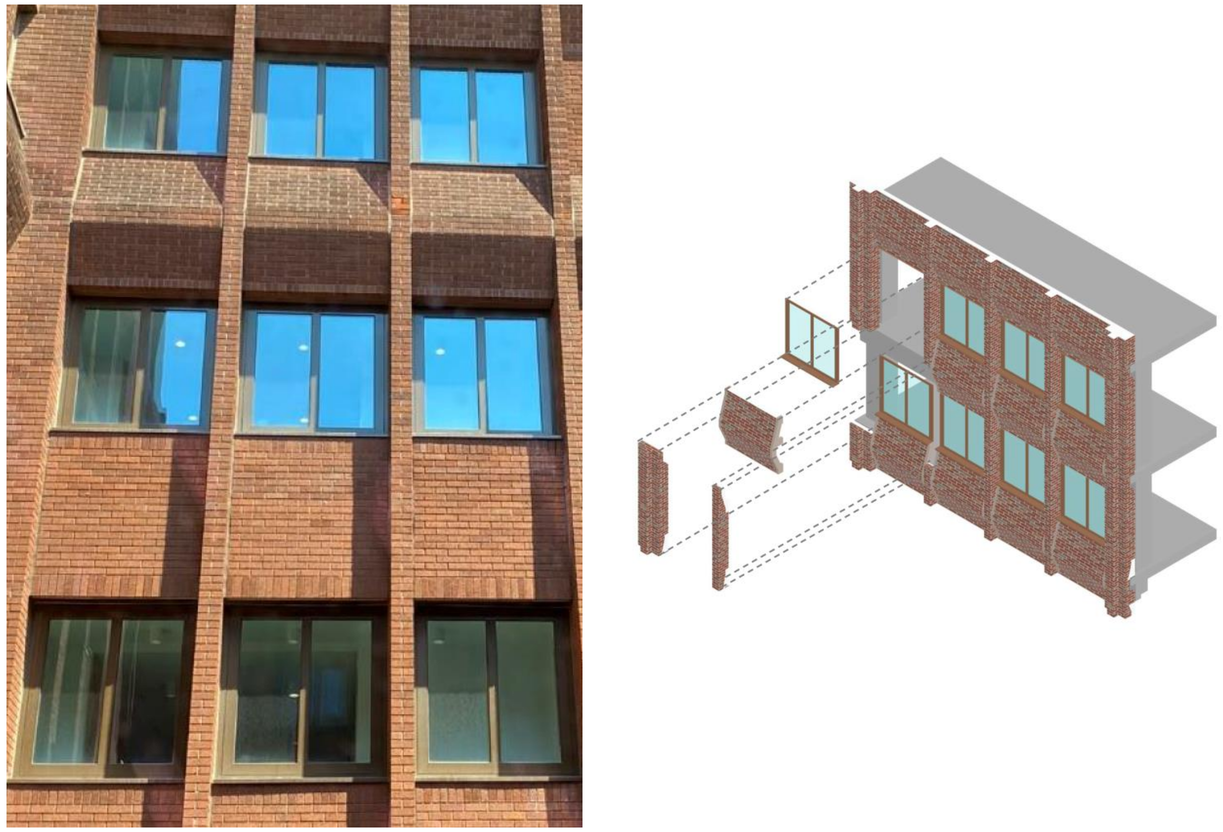


In terms of substructure and foundations, there is a single basement covering the site footprint, which is accessible via a ramp (for vehicles) from the ground floor. The substructure is generally considered to be 300mm RC perimeter retaining walls, under-reamed piles with pie caps (larger caps can be found under cores), with a ground-bearing 300mm thick RC slab supported by pile caps. There is some variation in the basement structural slab levels and internal headroom various accordingly in the basement areas, typically between 3.5-4.75m depending on location.

Figure 2.4.2: axonometric image of existing basement and GA markup drawing to show the differing slab to ceiling level heights within the basement across the different zones (via AKT II).

The existing facades consist of brick-clad precast concrete mullions and uninsulated spandrel beams fixed to slab edges or to the concrete columns. The windows are considered to be aluminium double-glazed units (DGUI) of a more recent installation (see Section 5 for more technical information on the existing windows and systems, including thermal performance). The facades are generally in a poor state of repair with numerous cracks and defects identified in the existing cladding, which has led to temporary remedial works such as netting to parapets to mitigate the risks of falling material. The existing façade system is not felt to offer anything positive to the existing streetscape; its monotonous, dark and oppressive character arguably detract from the other buildings within its locality.

Figure 2.4.3: photograph and exploded diagram showing a typical example of the existing façade systems at 125 Shaftesbury Avenue.



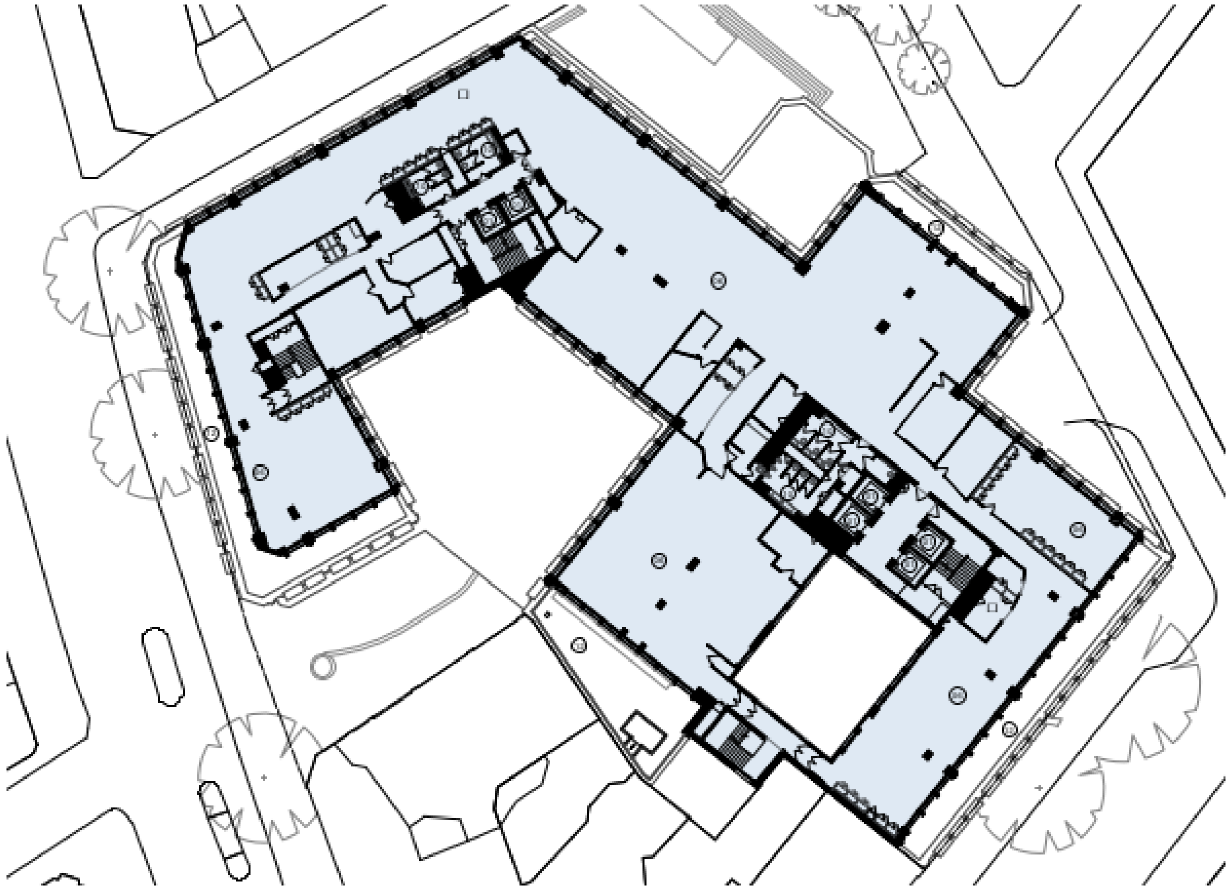
Building services systems are covered in detail in Section 4 and are therefore not detailed in full within this section. They are typically made up of a VRF-led all-electric HVAC solution, installed during the previous fit out. Most of the heating, cooling and ventilation plant can be found at roof levels (VRF units, AHUs etc.) across L10 and L07, with most of the central electrical equipment (HV/LV etc.) found at basement level across electrical plantrooms. There are no PV panels, water recycling or other such measures within the current building. Although the majority of the measured floor area achieves an EPC rating of B, the operational energy consumption of the existing building remains poor, even after the most recent fit out and services installations, suggesting a more fundamental change is required to achieve the kind of energy performance expected to meet today's onerous energy efficiency and reporting standards.

Figure 2.4.4: photograph showing external VRF and AHUs at roof level (L07), demonstrating the condensed and constrained spatial arrangements at roof levels with the current plant equipment and arrangements.

In terms of internal spaces, the key building use type is commercial office, with retail units at ground floor. Office accommodation can currently be found from L01-10. Regarding spatial arrangements, the existing floorplates are generally considered to be narrow and inefficient, with compromised existing layouts, although existing internal floor to ceiling heights are acceptable from a BCO perspective (albeit still sub-optimal for what is considered a best-in-class office in 2024). The layouts and arrangements are no longer considered to be reflective of modern office standards and user expectations. Refer also to Sections 3 and 5 for further detail here.

While there are various office spaces throughout the building, the building also contains some extensive commercial kitchen areas, meeting rooms, presentation auditoriums, breakout spaces and internal amenity areas inherited from its previous occupant. It is important to note that the development is currently vacant (previous tenant vacated the property in July 2023), and no occupiers remain within the demise at this time.

Figure 2.4.5: GA drawing showing existing typical layout (L06) demonstrating narrow and inefficient existing floorplates (via DSDHA).



Existing Building Uses

3.1 Functional Operation

Prior to the most recent occupier vacating the building (July 2023), the majority of the floorspace was functioning as a commercial office. Retail units are at ground floor, a number of which are still occupied and operating at the time of writing this report.

As described in Section 2.3, the quality of internal space is compromised by the narrow and inefficient floorplates which appear to be the same layouts as the original 1982 construction, which are not considered suitable for the modern office tenant. There may be opportunity to infill and laterally extend these floorplates to improve the spatial arrangements given the structural considerations set out in Section 5.3, and this has been explored by the project team.

Figure 3.1.1: GA drawing showing L01 and L06 plan layouts of the existing building demonstrating narrow and inefficient existing floorplates (via DSDHA).

As noted previously, the building is predominantly unoccupied and therefore its operational functions are not fully understood. The following observations have been made from site visits:

- The office entrance on Shaftesbury Avenue does not contribute to the visibility of the building. Its location against adjacent to Stacey Street, a narrow service street, does not promote building orientation, wayfinding or suggest an environment of quality.

- There is a change in levels across the site which leads to landscaping challenges, seen predominantly in the Phoenix Street / Stacey Street hard landscaped corner. This has resulted in poorly used spaces which may promote undesirable anti-social activities.

- The change in levels across the site have also affected the internal retail levels. Some level changes by ramp are unlikely to be Part M compliant.

- Despite having a loading bay, there is evidence the building is serviced on-street. The loading bay used to store bins and incoming deliveries, and vehicles often use the footpaths on Stacey Street which have caused significant damage.

- Nisbets retailers have reported that they need to use two platform lifts to access goods delivered to the loading bay in order to overcome the ramp structure in the basement beneath them.

- The vehicle ramp offered leased car parking spaces. This ramp looks to have formed the access into basement bicycle store; current guidance states that bicycle routes should not be shared with motorised vehicle routes.

- The massing of the building steps back at higher levels to make it less imposing. However, these do not offer any external terraces or amenities for the building, only accessible walkways for maintenance.

- The floor plans, which include two lightwells and 4 internal stairwells, is highly irregular which may cause disorientation to some users.

3.2 Existing User Experience

The office floorplates, which are the major use within the building from L01-10, are unoccupied, with the most recent tenant having vacated the building. With the current ownership under the Applicant being recent, there has been no opportunity to undertake user surveys to understand what they identify as the operational positives and negatives of the building. Data on these matters has been gathered from other sources including surveys and investigations.

While this may be considered a negative from the perspective of the need to gather use experiences to inform the feasibility study, a vacant property also provides additional opportunity for more detailed investigations and surveys that may not have been possible if a tenant was insitu.

3.3 Other Reuse Options

A number of different options for reuse have been considered for this site, as set out in the DSDHA study included in Appendix B. This includes the following options as per the EEA CPG Chapter 9:

- Refit.
- Refurbish.
- Refurbish & extend.
- Reclaim & recycle.

The outcome of this exercise was that the ‘Refurbish & Extend’ option offered the best balance of whole life carbon, energy performance, massing, quality of space and public benefit. Further detail is included in Appendix B. As noted in Section 2, the intent of the Applicant for the redevelopment of this site was never to progress with a full demolition and rebuild of the site, but to maximise structural reuse as far as possible to deliver the holistic sustainability and operational objectives.

Given that the existing building is currently a commercial office, and that the location, spatial planning, grids and floor to ceiling heights (amongst other factors) best suit the continuation of this use type, detailed analysis of a potential change of use has not been conducted for this site. The Applicant believes that a market-leading commercial office use type can still be delivered for this site while retaining significant elements of the existing structure.

Servicing

4.1 Existing MEPH Summary

In terms of mechanical, electrical, and public health (MEPH) systems, the existing building is comprised of an all-electric VRF-led heating and cooling solution, with centralised AHUs providing air to floorplates and building areas. These systems were installed during the last fitout of the building in the 2010s. A summary of the key MEPH elements of the existing building from surveys, technical reports and information from the 2010s fit out can be provided as follows:

Energy Use:

- Heating and cooling are managed by all-electric systems.
- Electricity is supplied via two basement substations providing three-phase power.
- Natural gas is used for cooking and hot water on the second floor commercial kitchens.
- Cold water is metered and supplied to the building.
- A Building Management System (BMS) oversees tenant equipment in the main office area, with some electricity metering (extent of connection to BMS and detail gained from meters suitable for a modern energy performance review is unclear based on survey feedback).

HVAC Systems:

- Four air handling units (AHUs) provide fresh air and extract stale air, recovering heat before exhausting. The AHU arrangement is a centralised system, and details of the specification of these AHUs is available.
- Heating & cooling is undertaken by LG two-pipe VRF systems with indoor and outdoor units (outdoor units located on L07 & L10 roofs) and pipework containing R410a refrigerant. Specification details of these systems are available.
- Additional systems service kitchens on the ninth and second floors, with smoke and WC extraction managed by dedicated fan systems.
- A BMS system was installed but the extent of its monitoring and feedback capabilities is unclear based on survey feedback.

Electrical Installations:

- Two substations supply power to the building and retail units.
- Main power distribution is managed through switchboards, sub mains, and motor control centres, the majority of which is retained from prior to the 2010s fit out works.
- Emergency and life safety systems feature automatic transfer switches for load management during power failures.
- LED lighting is used throughout, with specific designs for office illumination and emergency lighting provisions.

Domestic Water Systems:

- A GRP cold water tank feeds the building, with a booster pump set for circulation.
- Hot water is generated by electric heaters and gas-fired systems in the main kitchen.
- Safety features include thermostatic mixing valves to prevent scalding and leak detection systems in sensitive areas.

Vertical Transportation Systems (Lifts):

- 4 no. electric traction passenger lifts (15 persons/1,125 kg) serving B, G and 1-9, with lift 4 serving as the designated fire service lift.
- 2 no. goods/passenger lifts rated at 9 persons/1,200 kg serving B, G and 1-6
- 1 no. simplex direct acting hydraulic goods lift rated at 10 persons/750 kg

It is notable that a few systems were not replaced during the 2010s fit out, and these have been identified by the incumbent MEPH engineer for the fit out as follows:

- Lifts were not replaced in full but were refurbished to a standard that would extend their service life and operation.
- 8 no. VRF units serving non-office areas (retail units)
- 2 no. supply vent intake and extract ventilation serving non-office areas (retail)
- 2 no. extract flues, possibly serving the kitchen.
- 2 no. UKPN transformers.
- 3 no. landlord switchboards
- 4 no. tenant switchboards.
- Generator fuel tank.

Items such as communications cables, lightening protection, drainage and gas services may also have been retained during the more recent fit out, but the extent of this remains unclear based on the reports that the Applicant has been provided with. A number of these systems (expect perhaps for the lifts) are likely now at the end of their service life and would need replacement.

A Mechanical, Electrical and Public Health Equipment schedule is available for the installed works during the recent fit out and includes details of efficiencies and performance characteristics of the main equipment within the building. This information will be made available where equipment is deemed suitable for onwards reuse.

One of the main limitations of the existing systems is the use of the LG VRF systems. Invariably, VRF system components are specific to a single manufacturer; for example, you can only use and LG external unit with an LG internal unit and could not (for example) use a Mitsubishi external unit with an LG internal unit. This means that any future replacement either requires you to use the same manufacturer equipment, thus limiting system selection, or requires a complete overhaul of the system.

In addition, it is evident that the current systems utilise refrigerant gas R410a, which has a very high GWP of 2,088. As set out in CIBSE TM65 (2021), annual and end of life leakage rates for VRF systems are typically higher than larger ASHP units, and their smaller charge is mitigated by the fact that a large number of external units are required and refrigerant is present throughout all pipework. Refrigerant gasses are system-specific and you cannot simply change one refrigerant for another in an existing system. With current standards for refrigerants constantly evolving, and with the new UK Net Zero Carbon Buildings Standard (UKNZCBS) pilot scheme stating that the acceptable average refrigerant GWP of 677 (based on R32) would be required to align with the standard, the continued use of large quantities of R410a across the existing VRF systems at 125 Shaftesbury Avenue is unlikely to be acceptable for modern sustainable buildings over their life cycle.

The AHUs, which also have integrated DX heating and cooling coils, also include R410a refrigerant within those systems.

In is notable from the MEPH specifications set out for the 2010s fit out (see below example in Figure 4.1.1) that the majority of equipment performance was designed for compliance with the extant Building Regulations Part L at the time (2013 with 2016 amendments). This has now been replaced with Part L 2021, which has significantly more onerous performance requirements for both building fabric and building systems, so it is unlikely that the current equipment would support a meaningful reduction of operational emissions against thew newest version of Part L.

Figure 4.1.1: extract from the MEP Services Particular Specification for the 2010s fit out works at 125 Shaftesbury Avenue (AHU extract example).

> There shall be 3no. new supply and extract AHUs shall be installed at level 10 in the existing AHU plantroom, as well as 1no. new supply and extract AHU installed at level 6 roof level. The AHU plant shall be selected in order to meet required air volumes; they shall meet the performance requirements set out in Part L2. Units may need to be provided in sections and built in site due to space constraints.

There are no renewable energy systems installed in the existing building. The limited and constrained roof spaces are mostly taken up by plant equipment and maintenance/access routes. Accessibility to the various terraces and roof spaces where there is no plant is poor, with many terraces having no meaningful accessibility from inside the building, thus making future maintenance of any system placed in these locations very difficult.

4.2 Remaining Lifespan of Plant

Based on the findings of Section 4.1, some of the existing MEPH equipment within 125 Shaftesbury Avenue has remaining service life and may be suitable for onwards reuse. The Vendor's Technical Due Diligence (TDD) report from 2023, conducted prior to current building ownership by the Applicant, includes a summary review of key equipment and its remaining service life. Assumptions around remaining lifespans based on this report and typical equipment service life from CIBSE Guide M suggests the following:

- VRF systems (indoor & outdoor): 9-10 years
- AHUs: 9-10 years
- Lighting: 10+ years
- Generator: 10+ years
- Fire detection systems: 10+ years
- Domestic water & public health systems: 10+ years
- Lifts: 10+ years (based on refurbishment during recent fit out)

Except for the lifts, the items retained from prior to the recent fit out as detailed in Section 4.1 are assumed to be nearing the end of their service life and would need to be replaced as part of any future works to the building.

It is notable from the TDD report that the Building Management System (BMS) is not operable and appears not to have been commissioned properly or connected to the various meters that were installed during the recent fit out. This is one of the reasons why it was not possible to gain accurate meter reads from recent years (post-2010s fit out), as set out in Section 5.5. It is also unlikely that the BMS and metring is suitable for a modern low-energy development, which is informed by the requirements of energy certification schemes such as NABERS UK.

While the VRF systems have some remaining life (typically their life cycle is only 15 years), the continued use of a high-GWP refrigerant is unlikely to be palatable even in the short term for a development that is aspiring to meet onerous sustainability performance criteria, and without the ability to simply switch refrigerants within this existing systems, this presents a whole life carbon emissions issue that may result in the need to overhaul the current system.

It is also notable that the current systems were designed to meet the specific requirements and characteristics of the existing building, including the performance of the current facade. If retained insitu, they do not facilitate extensions or significant façade upgrades and replacements. This typically means that any scheme beyond a light-touch refurbishment would need to consider replacement of the MEP systems within the building. However, given the age and condition of the existing equipment, potential for onward reuse within other developments is possible. A detailed accounting of the existing MEP equipment has been provided within the Material Index Materials Audit (see Section 5.2). While the market for reused and refurbished MEP equipment remains relatively small, there is still opportunity for some of this equipment to have a second life in another building. The project team are exploring opportunities for this as part of our Circular Economy Strategy.

Energy performance requirements for buildings and what is now considered to be a sustainable low-energy building in terms of benchmarking have moved on considerably even since the fit out in the 2010s. At the time the most recent fit out was designed, key principles and benchmarks for low energy performance did not exist, such as the LETI Climate Emergency Design Guide (2020), the UKGBC Net Zero Carbon Targets for Offices (2020), the RIBA Climate Challenge (2021 v2) and onerous certification schemes such as NABERS UK, so were not possible to design to and work towards. This is reflected in the current energy performance of this building (see Section 5.5), which remains relatively poor even after the more recent interventions.

In addition, certifications and processes such as NABERS UK include key principles of commissioning, systems design, long-term management and performance that are much more difficult to achieve with existing systems that were not designed for the purpose of achieving low-energy benchmark performance. While there are means of modifying existing buildings to achieve improved energy performance and improved NABERS ratings (typically achieving a maximum NABERS rating of 4.5 Stars in Sweco experience), they are unlikely to be able to achieve the levels of performance of a system and building designed and operated specifically in accordance with the most recent best-practice guidance. The recent release of the UKNZCBS (September 2024) further compounds this issue, with the energy targets for whole-building being approximately half the current energy performance of the existing building.

Technical

5.1 Upgrades (Legislation)

There are a number of considerations around legislation and building regulations to be considered as part of the existing building, which include energy/EPC ratings, fire, accessibility and other key factors. These items are considered in this section.

In terms of EPC and energy performance, the building includes a number of spaces that have separate EPCs, and these are stated below. While the current Minimum Energy Efficiency Standards (MEES) regulations require a minimum of EPC E, it is likely that this will be upgraded to a minimum of B for commercial developments within any time period over which interventions may take place to the existing building (although it should be noted that this is not formally agreed at the time of writing this report).

Table 5.1.1: Summary of existing EPCs for the various uses at 125 Shaftesbury Avenue.

EPC Name	Use Type Coverage	EPC Registered (year)	Rating (score/band)
B1 Offices	Office	2019	42 B
96 Charing Cross Rd.	Retail	2017	86 D
Unit 5 Shaftesbury Av.	Retail	2017	74 C
121 Shaftesbury Av.	Retail	2017	87 D
123 Shaftesbury Av.	Retail	2017	94 D
98/102 Charing Cross Rd.	Retail	2017	96 D

The office currently achieves and EPC of B, while the majority of retail units achieve an EPC D, suggesting that improvements would need to be made to the retail offer as part of any potential refurbishment of the site to improve their performance.

It is important to state that an EPC rating is not reflective of actual energy performance. The constraints of the Part L method typically means that only 50% of energy consumption is captured (the ‘regulated’ part) prior to converting to an emissions rating, and research from the Better Buildings Partnership (BBP) has clearly demonstrated that a building that achieves a good EPC rating does not always equate to a building with low operational energy performance. In this way, basing an idea of good energy and operational carbon performance on an EPC rating is not appropriate.

This is backed up by some of the data within the EPC itself for the office element, which was lodged in 2019 (ref: 9225-3047-0810-0100-5191). More recent EPCs include a statement of ‘primary energy’, which is the annual energy consumption in kWh/m^2/year, including for transmission losses. Converting this back to on-site energy by removing the Part L factor for primary energy (1.5x) and doubling (2x) the energy consumption to account for unregulated energy that would is not reported in primary energy but would be a significant part of an actual energy calculation suggests that the actual operational energy consumption for this development is 216 kWh/m^2/year. This is almost 4 times the UKGBC’s Paris Proof targets and the GLA target for offices in the London Plan guidance. Therefore, while the EPC rating of B suggests good performance, the reality is that the actual energy consumption remains poor and well in excess of modern low-energy developments in London.

In terms of other legislative points, while not fully quantified we understand that there is an under-provision of cycle parking spaces and associated facilities to meet the current London Plan requirements. With the current basement layouts and arrangements, it would be very difficult to accommodate these spaces and facilities without more significant rearrangement and intervention, and therefore any refurbishment or redevelopment would need to consider this provision carefully.

With regards to access, there only appears to be 1 no. wheelchair-accessible toilet per office floor. This is likely to contravene the 40 maximum travel distance regulated under Building Regulations Part M and would need to be addressed as part of any works to the site.

In terms of fire and evacuation, no significant non-conformities were suggested within the third party Technical Due Diligence (TDD) report from 2023, expect for minor items such as locations of fire action notices. These issues were managed and designed in as part of the recent 2010s fit out of the scheme. Fire Risk Assessments (FRAs) were provided in 2016, 2018 and 2022.

5.2 Material Inventory

A comprehensive and detailed material inventory and audit has been undertaken by Material Index. The audit covered all elements and materials within the existing building. In total more than 380 different types of products and materials have been captured by this audit and included within the assessment process.

There are a set of broad categories (such as concrete, brick, metal, gypsum etc.) which have then been broken out in more specific detail for each category (such as aluminium in the windows and brass taps within the metals section for example). Each category and sub-product have been assigned with opportunities for reuse, recycling and other end of life scenarios. The broad categories and their concurrent quantities (kg) have been detailed in Table 5.2.1 below.

Table 5.2.1: table to show the broad material category quantities for existing materials on site at 125 Shaftesbury Avenue (via Material Index audit, 2024).

Material Category	Quantity (kg)	% of total
Concrete	19,235,169	77%
Brick	2,924,331	12%
Metal	2,487,498	10%
Ceramics	121,436	0.5%
Gypsum	71,784	0.3%
Timber	42,241	0.2%
Glass	35,848	0.1%
Electronics	27,383	0.1%
Carpet	21,427	0.1%
Stone	5,483	0.02%
Plastic	3,179	0.01%
Fabric	916	0.004%

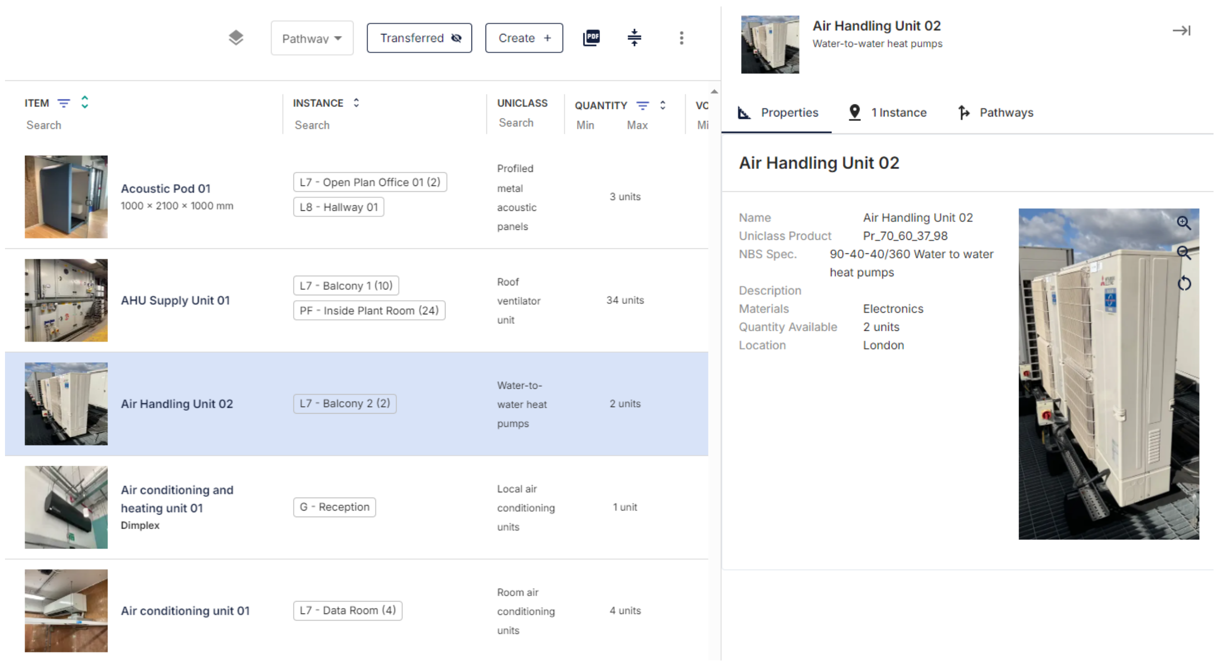
In total, **24,977** tonnes of material have been quantified as part of this audit for the existing building, which is a significant quantum. The most significant element is the structural concrete, which makes up 77% by mass of the quantified materials total at 125 Shaftesbury. Brick elements (associated with the facing brick on the precast panel elements of the existing facades) and metals (in particular reinforcing bar, which makes up the majority of mass in the metals category) also make up a significant quantum of existing materials, at 12% and 10% respectively.

With the depth of data available to us from the Material Index audit, Sweco have been able to model the approximate embodied carbon impact of the retained materials. This is represented as an 'upfront' embodied carbon emission, but only covering modules A1-A3 i.e. the carbon content associated with the manufacture of these materials, using typical default/generic embodied carbon factors from industry databases. This suggests that the A1-A3 emissions associated with the existing materials at 125 Shaftesbury Avenue are c.21,920 tCO_2e A1-A3, and in intensity terms (based on the GIA of 22,900 m^2 GIA set out in Section 2.3) is approximately 957 $kgCO_2e/m^2$ GIA. This is probably on the lower end of what the impacts would have been for the majority of materials in 1982 but given the lack of historic datasets associated with that time period for embodied carbon this provides a reasonable position for the carbon content locked within existing materials. Around 50% of this value is associated with the building structure.

Given the quantity and emissions associated with the structure, combined with the general understanding that new structure also contributes significant emissions, it can be argued that these elements should be the focal point of any approach to reuse of existing building elements. While façade brickwork also contributes a significant quantity of emissions, this is facing brick as opposed to brick that would be found in a wall of a typical home for example, and is bonded to the precast elements of the facades as well as having mortar between joints. These brick types are very difficult to extract and reuse unless the entire faced system is reused in situ. This has the potential for knock-on impacts for operational energy performance if the existing façade is retained (see also Section 5.4). Existing services also contribute significant mass and emissions, but their potential for retention and reuse needs to be considered against the points raised elsewhere in this document (Sections 4, 5.1 and 5.5 in particular).

The Materials Index audit goes beyond simply listing materials and quantifying mass, potential reuse and recycling metrics. The survey is completed on a collaborative and accessible online form which lists the details of all materials, allowing the design team to access this database like a 'materials bank' and review the potential for onsite or onwards reuse of all materials groups. An example of this element-by-element detail is shown below from the 125 Shaftesbury Avenue audit portal.

Figure 5.1.1: example of the MEPH section of the elemental detail for each building component within the MEP section, providing images and informative detail to support potential reuse.



The platform allows for a collaborative approach to defining opportunities for reuse of specific products and materials beyond just the major components like structures and facades. In addition, Material Index provide a service whereby options for onward reuse of products and materials is facilitated and navigated, which is also being utilised by the Applicant to explore all options for finding new homes for materials within their service life and in good operable condition. This 'live 125 Shaftesbury Avenue materials bank' is reviewed regularly as options for refurbishment and redevelopment of the existing building are considered.

The extent of reuse is under review and the full details of the % of materials to be reused and recycled will be provided within the draft Circular Economy Statement when the proposal for the site is submitted to London Borough of Camden.

5.3 Dimensional & Structural

The main structural design elements of the existing building are set out in Section 2.3 are not repeated here – please refer to that section for a structural summary and images of the existing building structure. Section 5.2 also details how significant the structural elements are in terms of overall mass of the existing building and also the potential retained embodied carbon where structural elements can be retained and reused.

The structural grid of the existing building is noted as approximately 7.8m x 7.8m, with local variations, due to the shape of the building being irregular. Material strength based on the historic structural drawings suggests 45N/mm^2 cube strength at 28 days for RC columns and 30N/mm^2 cube strength at 28 days for RC beam, slabs & wall.

A Structural Summary report conducted by Pell Frischmann in 2023 states the following about the design loads of the existing building structure:

"The imposed design load used for the original design was 5 kN/sqm for office floors plus 1 kN/sqm for partitions. The current Eurocode requirement is 2.5 kN/sqm for offices and 1 kN/sqm for partitions. The reinforced concrete frame and foundations are therefore robust. There are also significant loading allowances for building services and applied finishes."

This suggests that the design loads of the existing building are in excess of those that would be required today, which may result in greater future flexibility for potential extension and additional floors on top of the existing structure without adding in significant additional embodied carbon and materials associated with structural strengthening and transfers (subject to the type and extent of interventions proposed).

Reinforced concrete structures can be subject to alterations and/or experience deterioration mechanisms such as cracking, void, spalling, and reinforcement corrosion, that require attention in order to maintain and even prolong the service life of a structure. During the site visits several alterations to the concrete cover of the RC columns was observed. To address this, a road map has been set out to identify and scope the extent of defects and the appropriate repair detail, to provide a more robust set of information to inform potential for reuse. However, no significant structural defects have been identified as part of the existing surveys.

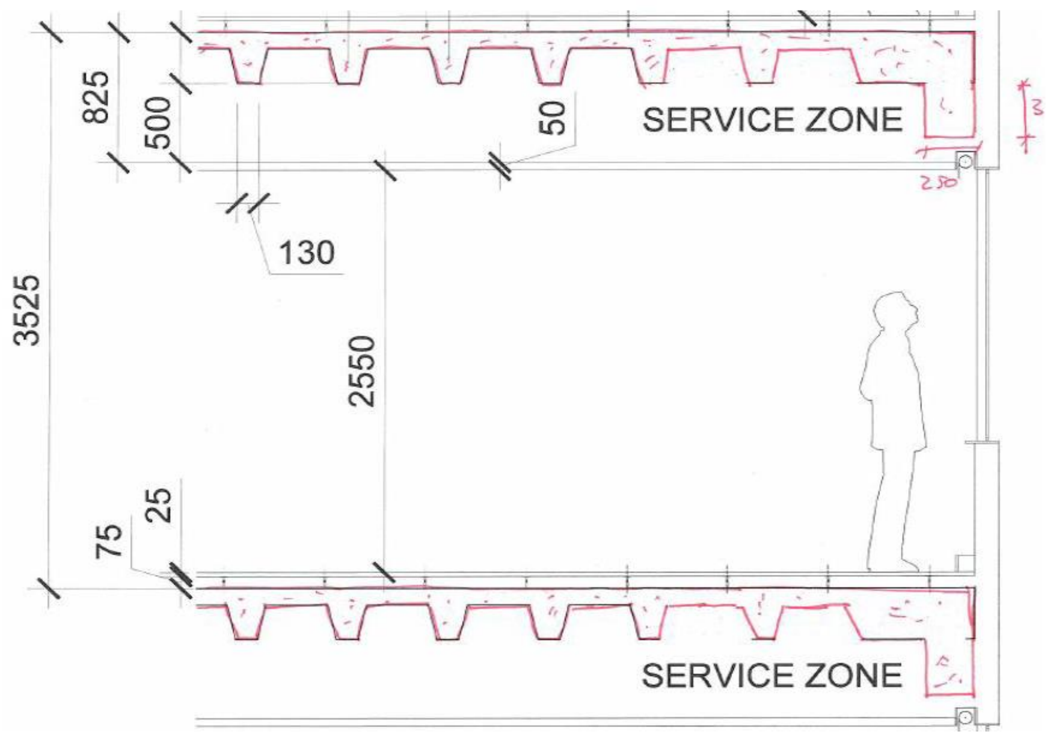
In terms of the foundations (which are also described in Section 2.3), Structural Engineer AKT II's early investigations have determined that large pile caps have been positioned under the stability cores to support the core walls and accommodate lift pits. The core pile caps have been formed with a uniform top level, and the slabs outside the lift pit construction at a higher level via a fill between the pile cap and the underside of the slab. This provides an opportunity to reuse the pile cap even in cases where the proposed lift shaft/pit has a different arrangement. To minimise the intervention to the existing foundation it is recommended that the pile caps are retained and only slabs and walls are subject to any eventual modification.

The findings of the surveys and investigations of the existing structure suggest that there is good opportunity for reuse of the existing structural frame, subject to the extent and type of interventions. It is important to note that cores may not be in optimal positions for a modern office with tenant partitioning of office floorplates but given the structural design of the building there is potential for movement and rebuild of cores without needing to excessively increase demolition across the floorplates where a more extensive refurbishment is desired (although some cut and carve would naturally be required in such scenarios).

The fire strategy details that elements of the structure have been designed to achieve 120 minutes fire resistance and integrity and insulation if they form part of a fire rated floor or wall. Fire protection is applied to any structure that is exposed, for example if any fire rated boarding is removed during the Facebook fitout works. Floor to floor compartmentation is provided to achieve 120 minutes protection.

In terms of internal spatial considerations and dimensions, the internal floor to ceiling heights and slab to slab heights vary across the upper floors depending on the level and location within the building. A drawing has been included in Appendix A of this report which demonstrated the various floor to ceiling heights. In addition, the below drawing from the Technical Due Diligence report provides a typical office floorplate zone section including service zone, with dimensions included.

Figure 5.3.1: typical office floor section for the existing building at 125 Shaftesbury Avenue.



While the achievable FFL to underside of ceiling heights would technically fall within the acceptable BCO range for refurbishments, they are still considered to be sub-optimal for a modern commercial office. In addition, floor zones may increase due to future services changes or changes to the facades and the need for occupant level access onto external terraces if they are created, which further constrains the achievable internal dimensions.

5.4 Fabric Performance

The existing solid elements of the façade are assumed to be from the original 1982 construction, and thus are 42 years old. As described in Section 2.3, the existing solid façade elements consist of brick-clad precast concrete mullions and uninsulated spandrel beams fixed to slab edges or to the concrete columns. The cavities are assumed to be uninsulated at this time based on investigations undertaken to date on the project. The evidence from the 2010s fit out notes that the opaque elements were not insulated or improved during that process as it was believed that the new MEPH installations mitigated the need for this to take place. The top levels of each elevation at roof include brick slip parapets.

The windows were updated during the 2010s fit out with new thermally-broken double glazed units with aluminium frames. Windows were replaced across all façade systems. Generally, windows are installed as 'punched' systems within the typical brick-faced precast façade bays, except for L05 where there is a 'bay window' type arrangement across the majority of elevations at this level, which is distinct from the façade systems at other levels. Glazes systems are installed to ground floor entrance areas.

Some images of the different systems are included below for clarity.

Figure 5.4.1: images to show the typical elevation façade system typology (opaque and glazed elements) and exploded diagram of the façade system components.

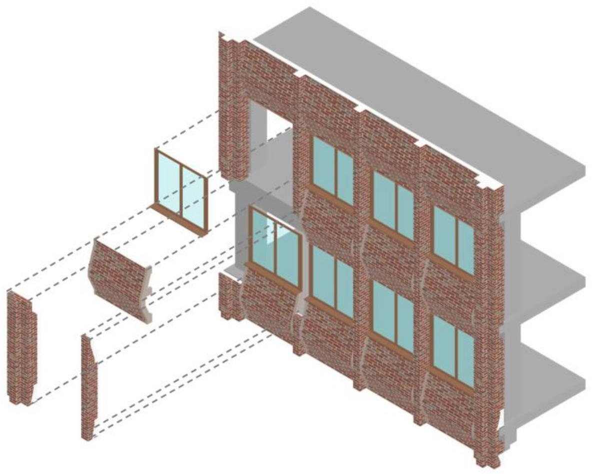


Figure 5.4.2: image to show the 'bay window' systems at L05.

In terms of performance, an assessment by the façade consultant Arup and review of the information from the 2010s fit out specifications suggests the following performance for the various typical façade components on the scheme.

Table 5.4.1: table to show the typical thermal performance of the existing façade components at 125 Shaftesbury Avenue (typical bay as per Figure 5.4.1).

Element/Criteria	Performance
Opaque/solid elements – U Values	2.7 W/m^2.K
Windows – U Values	1.8 W/m^2.K
Windows – g-values	0.6

The information above shows that the current performance of the façade systems are relatively poor and likely contribute significantly to the poor operational energy performance of the building in its current state. This performance would not be acceptable for a modern low-energy development; for example, the notional building performance targets in Part L2 2021 are 0.18 W/m^2.K for solid wall elements and 1.4 W/m^2.K for windows. The g-value is also significantly higher than the optimal performance for managing perimeter solar gains and overheating, which is typically <0.4. The LETI Climate Emergency Design Guide (2020) goes further, noting that U-values should actually be targeting 0.12-0.15 W/m^2.K for solid elements and 1.0-1.2 W/m^2.K for windows if buildings are to work towards Paris Proof energy performance. The existing building is considerably worse than this position, and without major intervention or full replacement it is highly unlikely that the building would be able to achieve the kind of energy performance that is being aspired to for this site.

Façade systems are critical elements in achieving low-energy performance. The notion of 'Fabric First', driven by outcomes of industry publications such as LETI's Climate Emergency Design Guide (2020) and tightening regulations such as Building Regulations Part L 2021, places specific emphasis on having very robust façade performance prior to design and installation of MEP systems; these two elements are intrinsically linked. It is arguable that this was not considered in the 2010s fit out (notably this was not supported or required by extant guidance at the time), which means that the MEPH systems were simply installed to provide benefit to operational energy without significant action taken to manage the façade performance, as is evident from the evidence we have gathered and the operational energy changes demonstrated in Section 5.5 pre and post the most recent fit out.

In addition, the condition of the existing façade systems is relatively poor, particularly at the parapets where netting and fall safety equipment is already installed due to their condition. The surveys provide evidence of numerous cracks and remedial works over the years and architecturally the façade us considered to be of poor character that does not provide benefit or architectural interest to its locality.

The age of the windows needs to be carefully considered. As they were installed in the 2010s fit out, they therefore have perhaps 15-20 years of usable service life left. The windows have been picked out as a key element for potential onward reuse and opportunities to facilitate this will be reviewed in detail. Due to their performance characteristics stated above, they are not deemed suitable for the future energy performance aspirations for 125 Shaftesbury Avenue, so would be unlikely to be reused on site in the event of more significant interventions or refurbishments. A further study on the limitations of potential reuse of existing façade elements is also captured in the study in Appendix B.

No details have been provided on thermal bridging or air permeability/leakage for the site at present, and this information is not possible to gather from the 2019 EPC.

In terms of roof systems, The building includes main flat roofs over the 10th, 9th, 6th and 1st floor levels. There are a number of terraces at numerous floor levels including over the bases of the central lightwells. Access to the main flat roofs is generally afforded via timber and PVCu door sets at the various floor levels. Access to the 10th floor roof is accessed via a vertical access ladder with cage and guard rails from the 9th floor. There is limited access to a number of the terraces via window sets, to allow for periodic maintenance works.

The 'inverted' style flat roofs comprise of reinforced concrete decks, overlaid with asphalt covering, cold applied liquid roof membrane, rigid insulation and pebbles, with an approximate U-value of 0.18 $W/m^2.K$. These elements would again requirement improvement to achieve Part L and Climate Emergency Design Guide targets for roof thermal performance, which are 0.15 $W/m^2.K$ and 0.10-0.12 $W/m^2.K$ respectively. Theses roofs include reinforced concrete upstands with brick slip capping detail on the top of the parapets typical of 1970s and 1980s construction, which are in poor condition as previously described.

Generally, the flat roofs incorporate paved slabs, mixed finish metal handrail and balustrading fixed to the concrete upstands. All roofs and terraces were recovered comprising of new liquid applied roof membrane, upstands and capping detailing together with new upgraded polystyrene rigid insulation and pebbles as part of the refurbishment works undertaken during the 2010s. The main roofs generally house mechanical plant in some areas supported on suspended steel frame platforms with galvanised steel walkways. The steel frames are shouldered by the concrete upstands resting on the parapets.

The 10th floor roof includes Telefonica Monopole Masts and metal enclosure suspended on steel beams, housing associated electrical and mechanical equipment maintained by Telefonica. The 6th floor roof contains steel frame louvered protection screens housing the mechanical plant equipment. The 1st floor roof contains steel frame enclosure with insulated metal covered panels and door set, housing mechanical plant.

It is a notable that a number of the terraces are roof systems include for a significant density of pant equipment, and the stepped terraces facing Charing Cross Road and Shaftesbury Avenue are inaccessible from the interior of the building. There is an extensive area of pebble ballast across the L10 roof space which may be suitable for installation of PV and urban greening, but access to this space for building occupants/office users is not possible in the current building arrangement and therefore any occupant benefit of these installations is negligible. Providing accessible outdoor spaces and terraces for occupant and user wellbeing, which often include extensive planted areas and greening, is seen as a core feature of modern office design and operation. The lack of access to the multitude of terraces and stepped roof systems is a significant issue for the existing building. At present, there is no urban greening across the building (expect for some trees within the site boundary at ground level) and no PV panel installation. Based on our findings of the MEP kit and the existing façade performance, adding PV panels to the existing building in its current state is unlikely to provide significant benefit to the existing building without more significant interventions to building fabric.

Slab to slab heights also vary significantly across the basement areas, as demonstrated in Section 2.3 and Figure 2.3.2 in particular. From record information, the existing basement structural slab level is typically +18.800m with exception to the North of the building where this level is approximately +20.220m. To the east of the site this level becomes +19.150m.

Given the variable thickness and levels of the ground floor slab the headroom in that basement varies between 3.5om and 4.75m. It should be noted this estimation does not account for any finishes applied to the slab and its deflection and tolerances.

5.5 Energy Modelling

Meter readings have been provided for the scheme prior to the 2010s fit out of 125 Shaftesbury Avenue. The last complete set of this data was from 2016 (2017 data was incomplete with a number of potential identified errors so was not able to be used for the purposes of this high-level energy assessment). No meter data was able to be provided post-fit out, only partially-complete billing information from which it was not possible to determine energy consumption. In place of meter data an extrapolation method from the 'primary energy' section of the EPC covering the office floorspace was used to reflect the existing building performance post-fit out as it covers 75% of the existing GIA.

More recent EPCs typically include an accounting of primary energy consumption. This reflects the energy that needs to be generated at source (i.e., power station) to serve the building, so includes an allowance for transmission losses. This is broadly calculated at 1.5x the energy demand of the building, as set out in the Building Regulations Part L2 documents. It is also worth noting that Part L and thus the EPC only accounts for 'Regulated' energy consumption, and 'Unregulated' energy is not covered by the reported values on the EPC. The meter readings (in theory) cover all energy consumption in the building, so without the addition of unregulated energy the two are not comparable even at a high level. Based on Sweco's experience of reviewing BRUKL output reports from Part L analysis, the 'Unregulated' energy portion is typically equivalent to the 'Regulated' portion. Therefore, to determine a comparable site energy consumption metric the primary energy metric on the EPC (162 kWh/m^2/year) is divided by 1.5 (to remove generation part) and then doubled to account for the unregulated energy. The comparable metrics are provided in the table below.

Table 5.5: comparative (high-level) energy consumption data for the pre- and post- 2010s fit out for 125 Shaftesbury Avenue.

Type & Year	Energy Use Intensity (kWh/m^2/year GIA Whole Building)	Source
Pre-Fit Out, 2016	235	Meter readings
Post-Fit Out, 2019	216	EPC Primary Energy extrapolation exercise

The data suggests that there was only a marginal improvement (-19 kWh/m^2/year) in the actual energy performance of the building after the fit out, even though windows and MEP services were replaced at this time. Both results are c.4 times the Paris Proof targets and those set out by the GLA in the London Plan Guidance for commercial offices. This is suggestive of the fact that these more recent interventions were not significant enough to improve the operational energy in a significant way, and that more intensive and fundamental interventions are required to ensure that the existing building can work towards these targets.

This is supported by some of the findings earlier in this report. Almost all of the key energy performance regulations, certifications and benchmarks that are widely recognised as best practice today were released after the most recent fit out was completed. The data from this fit out shows that while windows were replaced, no further upgrades were made to facades as it was believed that the installation of electric HAVC systems was 'sufficient' to meet regulatory energy performance requirements at the time of design and installation. This is not the fault of the engineer and contractors on the recent fit out, but rather a symptom of the speed at which expectations around operational energy performance and 'what best practice looks like' have changed in the last 5 years. These are only now starting to become established, culminating in the release of the UK Net Zero Carbon Buildings Standard guidance in September 2024.

The author acknowledges that the energy data comparison is imperfect for a number of reasons. It would have been optimal to have had two directly comparable meter readings to compare against one other, pre- and post-fit out, to ensure direct comparability and understanding of energy performance and the impact of the installations that took place in the recent fit out. However, as noted earlier in this report, survey findings suggest that the BMS was not commissioned or in working order so any data from these systems would likely have been compromised even if it was available to the project team.

While the meter readings from 2016 appear extensive and cover the majority of the building, we cannot be 100% sure that every part of the energy consumption is covered. The more detailed and comprehensive application of metering across buildings, informed by operational energy certification methodologies such as NABERS UK, was not actively applied until 2021-2022 on buildings, and therefore in Sweco's experience of interrogating existing building energy performance it is unlikely that all of the energy is captured in the meter data. Therefore, the actual energy consumption in 2016 is likely to be higher.

In a similar way, there is an acknowledgement from across the industry that energy data and extrapolation of energy from a Building Regulations Part L model is flawed; more detailed energy assessment method such as CIBSE TM54 make it clear that actual energy consumption in a building if often significantly higher than that reported using Part L methods. While effort has been made to extrapolate based on the rules and adding in the 'unregulated' element to ensure some degree of comparability, these is still a strong likelihood that the actual energy of the current building in 2019 was significantly higher than reported here.

Gathering usable data from the period of the EPC (2019) and when the previous tenant vacated the property (2023) would have been problematic in any case, as these were a number of 'Covid years' between these dates. Sweco have typically had significant difficulty in being able to accurately reflect energy performance of buildings from meter readings during this time period, due to the variable occupancy of buildings during this period skewing data provision. Lack of BMS connectivity and operation has also hampered our ability to collect better data for the post-fit out years of operation.

The conclusion is that both methods of collection are imperfect but utilise what was available to make an informed assessment, and based on the methods available both results are probably lower than they would be if modelled/studied against the industry standards of 2024. Therefore, the sources of this information do not detract from the fact that significant intervention would be required to ensure that 125 Shaftesbury Avenue can reduce operational energy consumption in line with market best-practice expectations.

In addition to overall energy use intensity, the overall ventilation strategy is likely to need to be revised in a significant way to achieve optimal low-energy performance. Ventilation systems for offices are typically arranged as either centralised systems (i.e. large-scale AHUs at roof or basement serving multiple office floors as per the existing building arrangement) or, more recently, on-floor AHUs on office floorplates that control specific areas of the building on a floor-by-floor basis. It is Sweco's opinion (and one shared by many in the industry) that the demand control and operational efficiencies achieved through on-floor AHUs is of critical importance to delivering low-energy buildings. This has been proved out in numerous energy models Sweco have conducted and is arguably one of the key methods through which more significant reductions on operational energy could be achieved at 125 Shaftesbury Avenue.

The key issue with deploying this within existing buildings is that the plant space requirements for on-floor AHUs are significant, and thus typically significant NIA is lost. If the intent is to retain the existing building and massing as-is, this solution is often unpalatable as there is no way of gaining back the lost NIA which renders most projects unviable. In addition, fairly significant façade modifications are often required for intake and exhaust of AHUs at each level (and sometimes in multiple locations at each level depending on the size of the floorplate), which need to be accommodated at the expense of the existing façade in those locations.

An optimal solution to ensure that these systems can be deployed is often to undertake a more extensive refurbishment and extension scheme that allows for NIA gains but also supports the implementation of on-floor AHUs within existing floorplates. This can still allow for retention of carbon-heavy elements such as structure (where other factors of condition and spatial arrangements support this) but still facility low energy ventilations systems implementation. Given the efficiency reliance of these systems on a robust and high-performance façade, and the necessity of optimising the size of the AHU equipment when placed on floorplates, their deployment is also often coupled with a more extensive façade replacement.

5.6 Site Capacity

Site capacity is typically referenced on residential sites and may not apply on this commercial application. Nonetheless, a simple summary of Site Capacity is included below:

The site, having already achieved Planning Permission in 2017, maximises on development potential the site has to offer, responding to Rights of Light constraints and guided by local massing heights. Opportunities to deploy a new arcade through the building at ground level, used primarily for retail, has the potential to reinstate historic connectivity of the site and maximise the number of active frontages. This was proposed as part of the 2017 Planning permission. This arcade is likely to improve urban connectivity by linking Old Compton Street to New Compton Street. It should be noted that this cannot be achieved in a light touch refurbishment and more significant intervention is required to achieve the arcade.

Conclusions

SWECO

6.1 Conclusions & Summary

This report has set out the findings of the Condition & Feasibility Study conducted by Sweco UK for 125 Shaftesbury Avenue, focusing on the operation, materiality and performance of the existing building. The content of this report has been set out to align with the requirement of London Borough of Camden's Energy Efficiency & Adaptability (EEA) CPG Chapter 9. The report has been informed by a significant level of survey and existing building information that has been gathered and reviewed as part of this study to provide an in-depth review of the insitu building at 125 Shaftesbury Avenue.

The key findings of this report can be summarised as follows:

- **Functional Operation:** There are some key functional operation issues of the existing building, such as differing levels of access and floorplates, the vehicle ramp and lack of accessible external spaces for building occupants. These are unlikely to require full demolition to resolve but would trigger necessary intervention.

- **Existing MEPH:** Existing MEP kit, while being relatively recently installed, does not meet modern low-energy performance standards, and includes significant quantities of high-GWP refrigerants such as R410a which are likely to be banned in the near future.

- **Existing MEPH:** The use of VRF systems limits any reuse/retention potential to a single manufacturer and the centralised AHU arrangement is sub-optimal for modern low-energy ventilation systems, which cannot be accommodated within the current massing due to their impact on NIA.

- **MEPH Service Life:** Existing MEPH equipment remaining service life is adequate, and a good proportion of the equipment could be considered for onward reuse.

- **Legislation:** The majority of EPCs are considered to be compliant with current regulations, but retail units may be non-compliant if MEES regulations change in 2025. The existing building has an under provision of cycle parking and facilities that do not meet current London Plan requirements, and an inability to improve this with the current spatial arrangement, particularly with the existence of the vehicle ramp at basement.

- **Material Inventory**: A significant quantity of the existing materials identified in the inventory report may be suitable for onwards reuse in the event of a more significant refurbishment/intervention, and exploration of these opportunities should be prioritised; the system for deploying the circular reuse strategy is already established and operational at 125 Shaftesbury Avenue with multiple systems under discussion.

- **Structure:** The existing concrete frame is robust and imposed design loads of the existing structure are higher than those that would be required under extant Eurocodes. The existing structure may facilitate retention & extension.

- **Spatial:** Internal floor to ceiling and slab-to-slab heights are variable and mostly sub-optimal for the modern office requirement but are within the acceptable BCO range for refurbishment. The quality of internal space is compromised by the narrow and inefficient floorplates.

- **Building Fabric:** Existing fabric performance is poor, and the façade is in poor condition. Recent window upgrades do not appear to have a made a significant difference to energy performance.

- **Energy:** The collated energy performance examples demonstrate that the interventions associated with the 2010s refurbishment did not improve energy efficiency in a significant way and suggests that more significant interventions are required to deliver energy performance that meets current expectations for market-leading sustainable developments.

On the basis of this report and its findings, it can be argued that a more significant intervention into the existing building is required to bring it up to a modern standard that achieves the multitude of regulatory, sustainability and operational requirements expected of a commercial office in London in 2024 and beyond. This is particularly associated with improving operational energy performance, where considerations of what best practice looks like have moved on considerably in the last 5 years, likely leaving the current building as a stranded asset, even with its more recent interventions. The operational energy findings justify this position. Overhaul and replacement of the compromised façade and MEP systems would support optimised performance.

However, the report also finds that there is potential for significant parts of the existing structure to be retained and reused in any new scheme. In addition, a number of the materials that may be stripped out in a more significant intervention are generally in good condition with some remaining service life, and therefore the deployment of the intensive assessment of identifying opportunities for onward reuse of items that cannot feasibly be reused on site, supported here by the digitalisation of opportunities by Material Index, will be key for wider decarbonisation and realisation of a meaningful circular economy strategy.

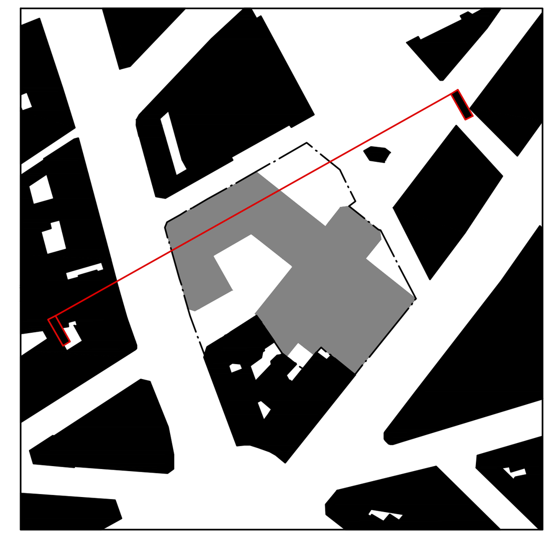
On this basis, a number of options were considered for this site, as set out in the DSDHA study included in Appendix B. This includes the relevant options as per the EEA CPG Chapter 9. This study also brings in wider considerations about the best use and design for the site, concluding that a retention and extension scheme offers the best overall outcome for 125 Shaftesbury Avenue.

Appendix A

Existing Section Drawing (125 Shaftesbury Avenue)

0 5 10m

NOTES



N

GENERAL NOTES:

Detail drawings show layouts and design intent and should be read in accordance with Architectural General Arrangement drawings, Architectural Outline Specification, and any Schedules.
Drawings may indicate elements to be designed and specified by other Consultants for coordination purposes. Please also refer to these drawings, schedules and specifications. Please report any discrepancies to the Architect for confirmation.
Full fabrication drawings to be provided for approval of all elements, details and interfaces.
All details and interfaces within Contractor Design Portion to be developed with Contractor and key Subcontractors. Sealant and weathertightness joints may be omitted for clarity.
All insulation thicknesses, levels and calculations to be confirmed as part of Stage 5 design.
All materials shown may be subject to change during Stage 5 design.
All drawings to be read in conjunction with other consultants' information (drawings, reports, specification)
Existing structure based on survey.
Structure shown is indicative. Please refer to structural engineer's information.
Areas are approximate and subject to change throughout design development of the proposals. Any areas measured from these plans relate to the areas of the building at the current stage of the design. Any decisions to be made on the basis of these predictions, whether as to forecast viability, pre-letting, lease agreements or the like should include due allowance for the increases and decreases inherent in the design development and construction processes.
Do not scale off drawing. Use figured dimensions only.
All dimensions are in millimeters.
All dimensions to be verified on site before proceeding.
All discrepancies to be notified in writing to architect

General Notes:

Existing drawings are for reference only - not for approval

Key:

01. Office Floorspace
02. Retail Unit
03. Nisbets (Existing Retail Unit)
04. Reception
05. WC's
06. Office Canteen
07. Kitchenette
08. Lift Shaft
09. Stairs
10. Parking
11. Motor Room
12. Plant Room
13. External Plant Area

Assumed slab underside — —

rev	date	author / check	comments
–	25.09.24	ARA	Draft Issue

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project

125 Shaftesbury Avenue
London
WC2H 8HR
Edge and Mitsubishi

drawing title

Existing Section CC
Slabs and floor to ceiling heights

drawn	date	size	scale
ARA	25/09/24	A1	1:100

VER project ref	revision
SK010	Suitability Code Revision

drawing number

125SA-VER-XX-SK-A-SK010

Appendix B

EEA CPG Chapter 9 Development Options Appraisal (DSDHA)

125 Shaftesbury Avenue

Carbon Optioneering

31/07/2024

July 2024

Design Approaches

Testing all retention options

The Team have researched and tested multiple design options before bringing proposals to Pre-Application stage.

We have tested four possible scenarios in detail ranging from light touch refit to full new build, as well as two different degrees of retention. We have also assessed crefurbisj and extention of constented scheme from 2016.

We acknowledge that this is a key project issue and present a summary of our analysis in the following pages to demonstrate that this has been carefully considered.

We have also prepared detailed carbon calculations for each option.

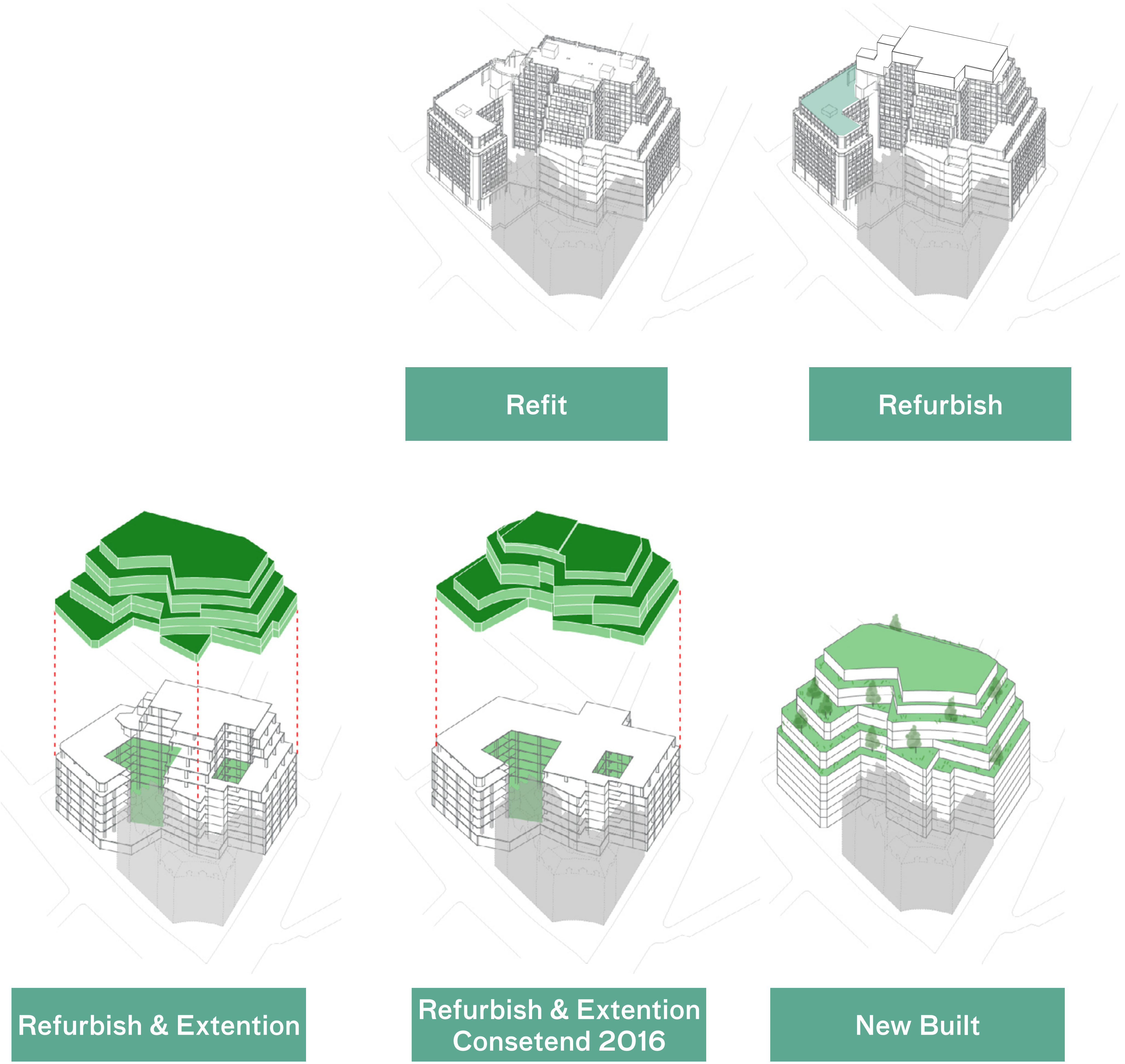
As noted in our summary notes, a light touch refurbishment, or refit, will not address the fundamental issues of the existing building and will not provide any public benefits.

The Team also acknowledge that a fully new build development is not the most responsible carbon conscious direction to take.

Even the consented scheme that was retaining part of the structure, did not take into consideration almost full structure retention.

Given all of the above, a densification of the site, together with a significant portion of retention, will be the best balance to bring forward all the wider benefits that the proposal offers.

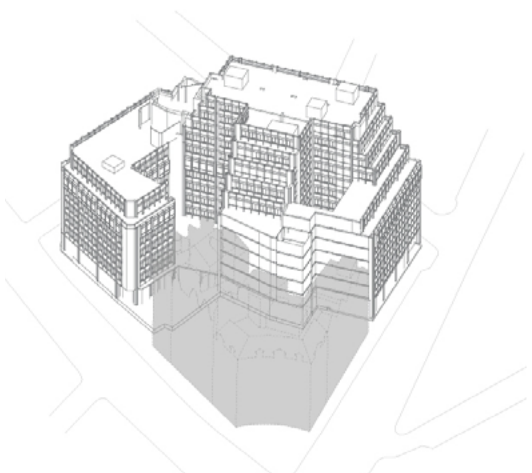
Therefore, our focus has been on the optimal retention scheme to ensure we utilise the existing building as best we can while ensuring that any additional carbon is of positive benefit.



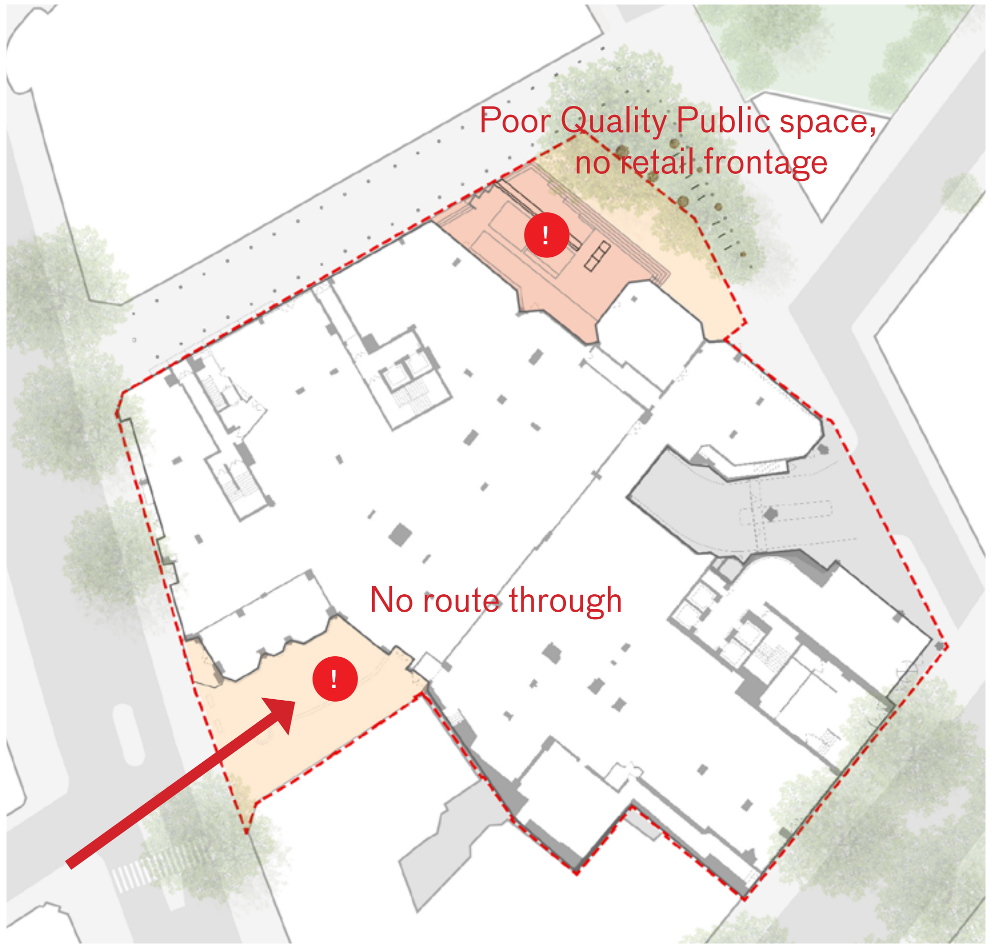
Design Approaches - Refit

Massing	Will not provide additional massing which is required to release other improvements.
Quality of space	The quality of space for future users is low due to narrow floor plan. No outside green amenity. Floor to ceiling height not improved due to structure retention.
Embodied Carbon	Low embodied carbon through the retention and retrofit but affected by new MEP
Operational Carbon	Full MEP replacement required. No opportunity for PVs. Inefficient servicing due to building constraints.
Public Benefit	No opportunity for enhanced urban greening and surface water management due to lack of space. No pedestrain route through the site. No enhanced perceived surveillance with retained retail frontage.
Summary	Despite low embodied carbon, operational carbon is high due to existing facade performance limitations and lack of space for sufficient MEP equipment at basement and roof level.

Although high on retention, a retrofit will provide poor quality of space for future users, does not address the fundamental issues of the site and not provide any public benefit at ground floor.



Typical Floor

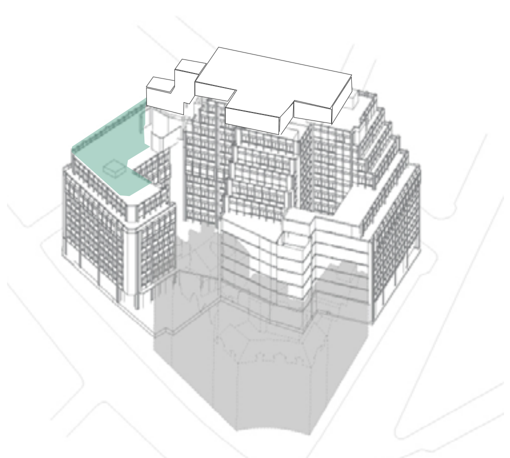


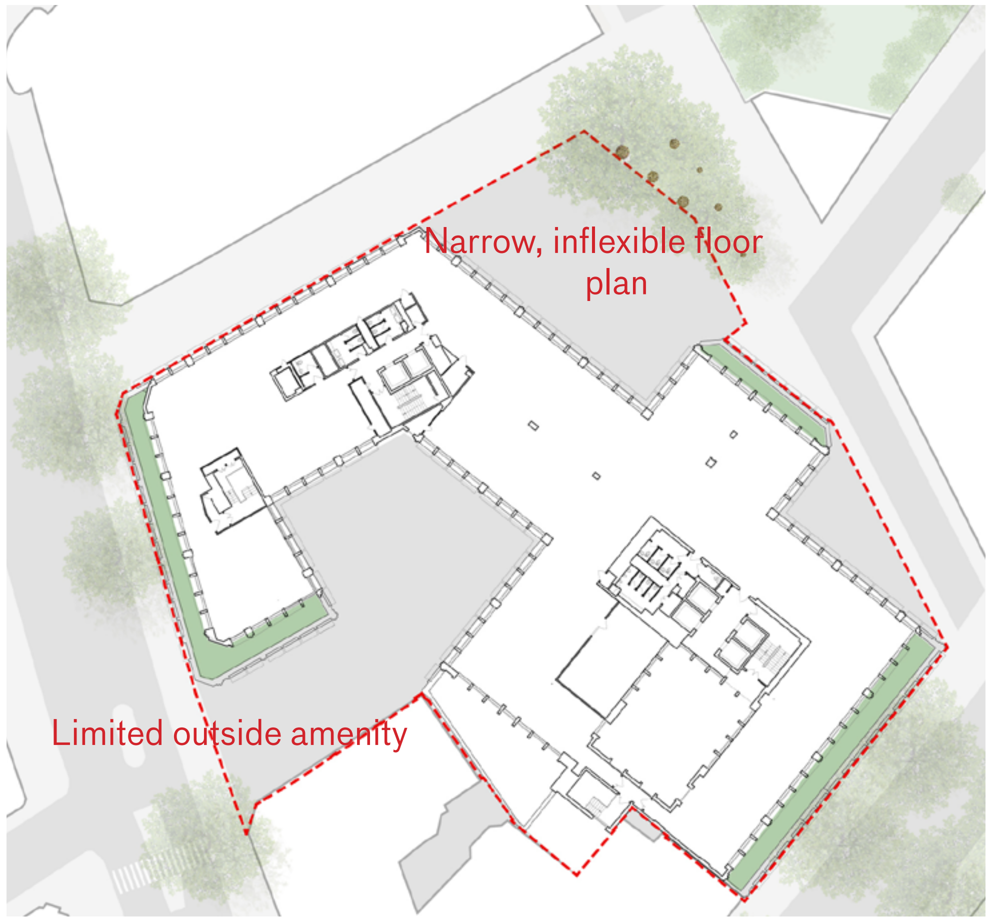
Ground Floor

Design Approaches - Refurbish

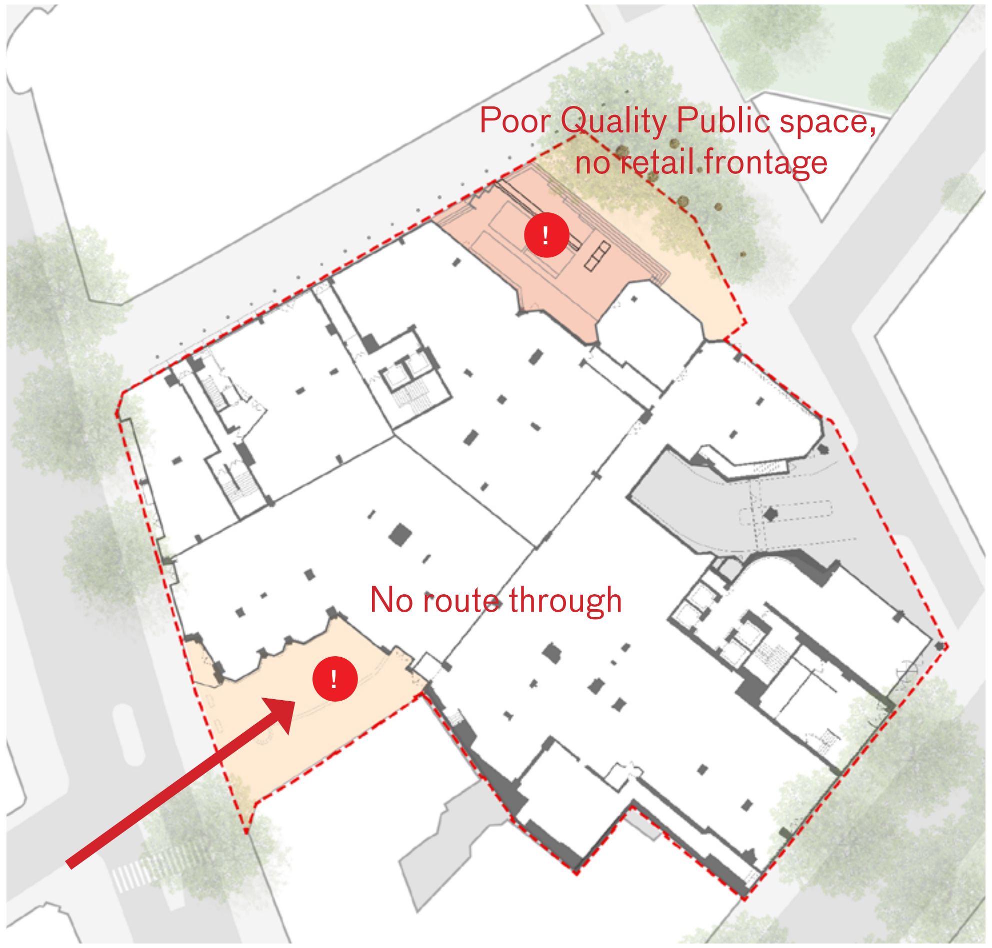
Massing	Will not provide additional massing which is required to release other improvements.
Quality of space	The quality of space for future users is low due to narrow floor plan. Limited outside green amenity. Floor to ceiling height not improved due to structure retention.
Embodied Carbon	Low embodied carbon through the retention and retrofit but affected by new MEP and facade thermal line.
Operational Carbon	Full MEP replacement required. No opportunity for PVs. Facade performance improved.
Public Benefit	No opportunity for enhanced urban greening and surface water management due to lack of space. No pedestrain route through the site. No enhanced perceived surveillance with enhanced retail frontage.
Summary	Operational carbon is still high due to existing facade performance limitations and lack of space for sufficient MEP equipment at basement and roof level.

Although the quality of office space is improved compared to refit, a refurbish still does not address the fundamental issues of the site and does not provide any public benefit at ground floor.





Typical Floor



Ground Floor