125 Shaftesbury Avenue

Circular Economy Statement

Prepared by SWECO SUSTAINABILITY

Submitted on behalf of VREF Shaftesbury SCS

November 2024

Contents

Rev	Date	Reason for Issue	Prepared		Reviewed	Approved
P00	15.11.24	Issue for Planning	RC	15.11.24	MM	MM

Executive Summary

This Detailed Circular Economy Statement (CES) has been prepared on behalf of VREF Shaftesbury SCS (the 'Applicant') by Sweco UK for the remodelling, refurbishment and extension of 125 Shaftesbury Avenue, London, WC2H 8AD (the Proposed Development) in the London Borough of Camden (LBC). This report sits alongside the following documents, which should be read together as a complete set of information for the purposes of planning:

- Energy & Sustainability Statement
- Condition & Feasibility Study
- Pre-Demolition Audit
- Whole Life Carbon Assessment

The development planning description is as follows:

"Remodelling, refurbishment and extension of the existing building to provide Use Class E commercial and retail space, amenity terraces, a new public route, relocated entrances, cycle parking, servicing and rooftop plant along with associated highway, landscaping and public realm improvements and other associated works".

The CES has been undertaken in accordance with GLA London Plan Guidance (LPG) Circular Economy Statements (March 2022) with the supporting GLA – Circular Economy Statement Template provided in Appendix A. This document outlines the strategy for the Existing and Proposed Development in line with the GLA Decision Trees for each respectively.

The key circular highlights for the Proposed Development centre around a refurbishment and retrofit approach with high levels of retention to reduce the generation of waste and conserve existing materials. New materials for the Proposed Development will be subject to review to maximise the recycled content and secondary materials during the next design stages.

99%

Specifically with regards to demolition waste – Reuse and Recycling will be prioritised over Recovery and Landfill waste destinations.

95%

The Proposed Development will ensure each stage has a high level of reuse and recycling where the targeted rates for diversion from landfill are reported when available.

20%

The Proposed Development is targeting recycled content rates for the new materials ensuring secondary are chosen above virgin materials.

30%

The disassembly and direct use of material elements is of high priority for the Proposed Development to enable urban mining activities for future projects.

95%

It is anticipated that the proposed materials for the Development will have a high anticipated useful end of life.

Introduction

1

1.1 The Proposed Development

The proposed site is located at 125 Shaftesbury Avenue, London, WC2H with an approximate grid reference E529955 N181103. It lies approximately 100m south of St Giles in-the-fields Church, 250m south of Centre Point / Tottenham Court Road Station (Central and Northern lines and Crossrail) and 250m north of Leicester Square Station (Northern and Piccadilly lines). The site covers an area of approximately 61m by 52m and is bounded by:

- Charing Cross Road to the south west;
- Shaftesbury Avenue to the southeast;
- Stacey Street to the northeast; and
- Phoenix Street to the northwest.

The 0.354ha site lies within the London Borough of Camden and sits between the distinct character areas of Soho, Covent Garden, Seven Dials and Bloomsbury. It is not located within a Conservation Area but is part of a small urban pocket surrounded by the Soho, Denmark Street and Seven Dials Conservation Areas.

The site is currently occupied by a basement, ground plus 10-storey building designed by Ian Fraser, John Roberts and Partners and completed in 1982. When the building was first completed, a retail arcade occupied much of the ground floor, providing a pedestrian route through the building. This was later closed after it failed economically and was replaced by a single large retail unit. The site adjoins Trentishoe Mansions on Caxton Walk/ Charing Cross Road and 119 Shaftesbury Avenue. The site also shares a light well with 24 Cambridge Circus and 84-86 Charing Cross Road (currently occupied by McDonalds). Tenants of these adjoining buildings currently enjoy rights of escape through the basement of 125 Shaftesbury Avenue.

The landmarks near the site include St Giles in-the fields Church, Centre Point, Seven Dials and Central St Giles. Tottenham Court, Road Station, the West End Project, and Crossrail have transformed this West End location and attracted further significant investment in the area.

The proposed development is designed to contribute to the ongoing improvement and reinvention of this central London location.

Proposed Use Class	Proposed GIA (sq m)
Office (Class E)	32,435
Retail	862
TOTAL	**33,297**

DSDHA CGI

1.2 Circularity Drivers for the Built Environment

UN Sustainable Development Goals

Adopted by world leaders, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development officially came into force on 1 January 2016.

The initiative is formulated to be an all-encompassing drive to end global poverty and other deprivations as part of a strategy that also encompasses improvements in health and education, reductions in inequality, economic growth, strategies to tackle climate change and preservation of the world's oceans and forests.[1]

9. Industry, Innovation and Infrastructure
Sustainable buildings and cities provide equitable and high-quality urban and regional infrastructure that promotes economic development, human welfare and cleaner operation. The transition to a low carbon economy requires mobilisation of industry alongside championing innovation. It is also vital that action is undertaken at a systems level – including infrastructure as well as individual built assets in order to drive transformation to a sustainable built environment.

11. Sustainable Cities and Communities
Sustainable built environments can make human settlements inclusive, safe and resilient. Sustainable cities provide access to high-quality housing and public infrastructure to all citizens, promoting harmonious social, environmental and economic development.

12. Responsible Consumption and Production
Sustainable built environments are made up of circular buildings that optimise resource use, result in zero waste to landfill, and support the regeneration of nature. They operate as part of a closed-loop system with circularity principles embedded across the value chain, at a building and city scale.

13. Climate Action
Sustainable built environments support clean and energy efficient cities to work alongside individual built assets to decarbonise public resources and infrastructure, incorporating future-proofing mechanisms to improve resilience and adaptation to future climatic change. A sustainable built environment is fundamental to global climate action efforts, both from decarbonisation efforts to stay on the trajectory of a 1.5°C warmer future, as well as being places for action on climate resilience and adaptation to the inevitable impacts of climate change.

17. Partnership for the Goals
A just and equitable transition to sustainable buildings and cities will require powerful partnerships that enhance knowledge sharing and ambition across the three pillars of sustainability — planet, people and economies.

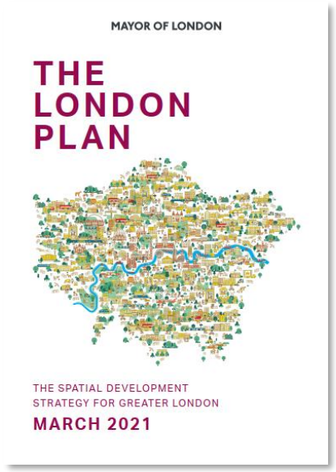
The London Plan (March 2021)

The London Plan is a spatial development strategy setting out an economic, environmental, transport and social framework for the development of London to 2036.[2]

Policy SI 7 Reducing waste and supporting the circular economy

A Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
2) encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products
3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026
4) meet or exceed the municipal waste recycling target of 65 per cent by 2030
5) meet or exceed the targets for each of the following waste and material streams:
a) construction and demolition – 95 per cent reuse/recycling/recovery
b) excavation – 95 per cent beneficial use



[1] UN SDG: https://sdgs.un.org/goals

[2] The London Plan (2021): https://www.london.gov.uk/programmes-strategies/planning/london-plan

6) design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

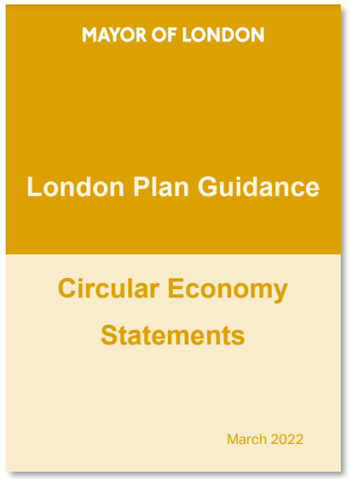
B Referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

1) how all materials arising from demolition and remediation works will be re-used and/or recycled
2) how the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life
3) opportunities for managing as much waste as possible on site
4) adequate and easily accessible storage space and collection systems to support recycling and re-use
5) how much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy
6) how performance will be monitored and reported.

C Development Plans that apply circular economy principles and set local lower thresholds for the application of Circular Economy Statements for development proposals are supported.[3]

GLA Circular Economy Statement Guidance

The adoption of the published London Plan (March 2022) requires a supporting Circular Economy Statement to respond to Policy SI7 'Reducing waste and supporting the Circular Economy'.



"Referable application" should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

- *How all materials arising from demolition and remediation works will be re-used and/or recycled;*
- *How the proposal's design and construction will reduce material demands and enable building materials, components, and products to be disassembled and re-used at the end of their useful life;*
- *Opportunities for managing as much waste as possible on site;*
- *Adequate and easily accessible storage space and collection systems to support recycling and re-use;*
- *How much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy;*
- *How performance will be monitored and reported.*

[3] The London Plan (2021) pages 380-381: https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

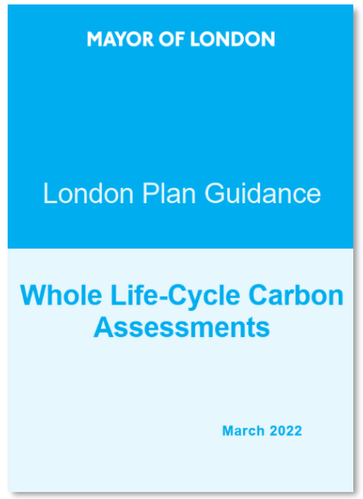
The circular economy statement guidance released by the Mayor of London provides the necessary strategic approach to accompany planning applications. The key aims of the circular economy statement are as follows:

- Consider strategies to facilitate the transition towards a circular built environment;
- Report against numerical targets that will facilitate monitoring of waste and recycling; and
- Recognise opportunities to benefit from great efficiencies that can help to save resources, materials and money.

The guidance document provides core principles to promote a regenerative and restorative whole systems approach where key performance targets can be set against each.

GLA Whole Life-Cycle Carbon Assessments Guidance

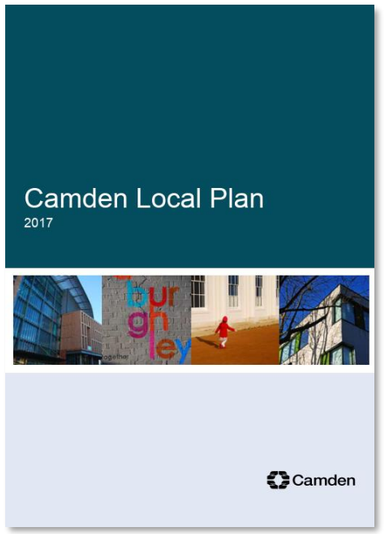
In addition to the Circular Economy Statement, the published London Plan requires a Whole Life-Cycle Carbon Assessment to be undertaken to support Policy SI 2 F for referable schemes and is encouraged for non-referable developments. Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from the materials, construction and the use of a building over its entire life, including its demolition and disposal. A WLC assessment provides a true picture of a building's carbon impact on the environment.



There is a close relationship between the Circular Economy LPG and the Whole Life-Cycle Carbon (WLC) LPG, which should be addressed as follows:

- *The same Bill of Materials should be used for CE and WLC assessments*
- *The promotion of CE outcomes should also reduce the WLC of the development (modules A-C of BS EN 15978), or provide additional benefits beyond the development's life (module D)*
- *The end-of-life scenarios developed through the CE statement process should be used to inform the assumptions made in the WLC assessment*
- *Design decisions should be informed by the principles and results of both studies*
- *The CE statement should cross-reference relevant parts of other documents submitted as part of the planning application.*

Camden Local Plan (Adopted 2017)



Policy CC1 Climate change mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

> *e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and*
>
> *f. expect all developments to optimise resource efficiency.*

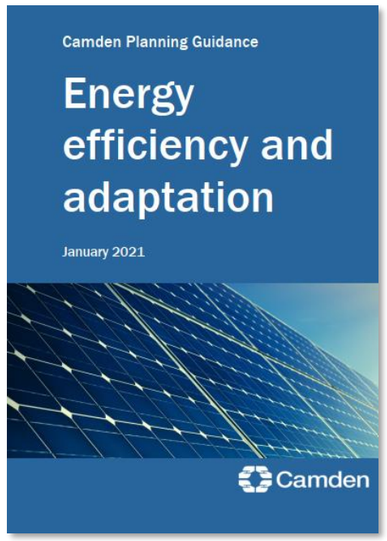
Policy CC5 Waste

The Council will seek to make Camden a low waste borough.

We will:

a. *aim to reduce the amount of waste produced in the borough and increase recycling and the reuse of materials to meet the London Plan targets of 50% of household waste recycled/composted by 2020 and aspiring to achieve 60% by 2031;*
b. *deal with North London's waste by working with our partner boroughs in North London to produce a Waste Plan, which will ensure that sufficient land is allocated to manage the amount of waste apportioned to the area in the London Plan;*
c. *safeguard Camden's existing waste site at Regis Road unless a suitable compensatory waste site is provided that replaces the maximum throughput achievable at the existing site; and*
d. *make sure that developments include facilities for the storage and collection of waste and recycling.*

CPG – Energy and Efficiency and Adaptation (2021)



The Camden planning guidance on energy efficiency and adaptation, particularly in Section 9 regarding reuse and optimising resource efficiency, emphasises the importance of sustainable development practices. This section encourages the reuse of existing buildings and materials to minimise waste and reduce the environmental impact associated with new construction. It promotes strategies that focus on maximising resource efficiency throughout the lifecycle of a project, including design, construction, and operation.

Key aspects of this guidance include:

Building Reuse: Encouraging the adaptation of existing structures rather than complete demolition, which can preserve historical value and minimise resource consumption.

Material Efficiency: Advocating for the use of local, sustainable materials and the recycling of materials from demolished or refurbished buildings to reduce the demand for new resources.

Design for Longevity: Promoting designs that enhance the durability and adaptability of buildings, allowing them to meet changing needs over time without requiring significant alterations.

Waste Reduction: Implementing waste management plans during construction to reduce landfill contributions, including strategies for recycling and reusing materials on-site.

Lifecycle Approach: Considering the entire lifecycle of materials and energy use, from extraction and production through to end-of-life disposal, to optimise overall resource efficiency.

Collaboration and Community Engagement: Encouraging collaboration among stakeholders, including architects, builders, and the community, to identify opportunities for resource optimisation and reuse.

Draft New Camden Local Plan

Policy CC1 - Responding to the climate emergency

A. The Council will prioritise the provision of measures to mitigate and adapt to climate change and require all development in Camden to respond to the climate emergency by:

ii. Prioritising and enabling the repurposing and re-use of existing buildings over demolition;

iii. Following circular economy principles, minimising waste and increasing re-use;

iv. Reducing whole life carbon emissions, by taking a whole life carbon approach, considering both embodied carbon and operational carbon;

Policy CC2 - Repurposing, Refurbishment and Re-use of Existing Buildings

A. The Council will seek to ensure that the repurposing, refurbishment and re-use of existing building/s is prioritised over demolition.

B. Where sites include existing building/s, applicants will be required to undertake a condition and feasibility assessment, to understand the re-use potential of the existing buildings and explore the best use of the site. This should be undertaken at the earliest opportunity, as part of the design process.

C. Taking into account the findings of the condition and feasibility assessment, applicants will be required to demonstrate that alternative development options (such as refit, re-use, refurbish, substantial refurbishment and extension) have been fully explored.

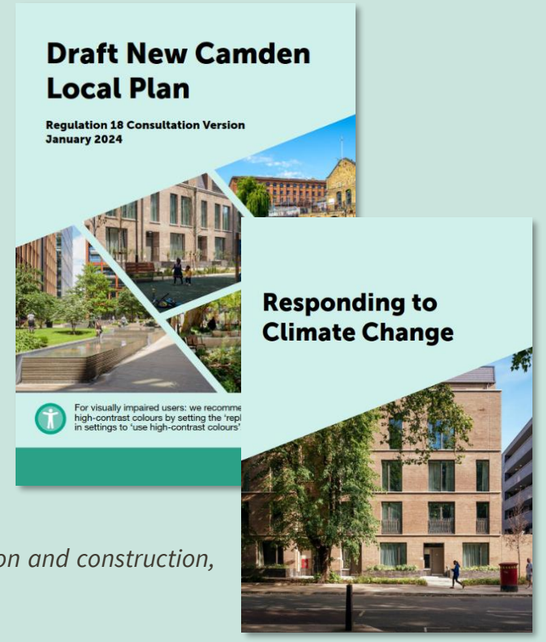
D. Applicants should discuss the findings of the condition and feasibility assessment and the assessment of alternative development options (as set out in criteria B and C above) with the Council, at the earliest opportunity, before progressing the design of any scheme.

E. The Council will only permit proposals that involve the partial or substantial demolition of existing building/s, where it can be demonstrated to the Council's satisfaction that:

i. The applicant has comprehensively explored a range of alternative development options, informed by the condition and feasibility assessment, prior to considering full or partial demolition.

ii. The proposal constitutes the best use of the site, when considered against alternative options involving the retention, repurposing, refurbishment and/or re-use of the existing building/s.

F. Where it is demonstrated to the Council's satisfaction that the partial or full demolition of existing building/s is justified, the applicant will be required to submit a pre-demolition audit. This should demonstrate that the re-use of materials has been explored on site; identify all materials within the building and document how they will be managed; show how building material waste will be minimised; and demonstrate that circular economy principles have been applied in accordance with Policy CC3 Circular Economy and Reduction of Waste.



Policy CC3 - Circular economy and reduction of waste

A. The Council will seek to ensure that developments minimise waste, use resources efficiently, and are designed to facilitate easy maintenance and adaptability of use.

The Council will:

i. Require all developments to optimise resource efficiency by:

a. Reducing waste through the application of the waste hierarchy (Prevention, Preparing for reuse, Recycling, Other recovery, Disposal);

b. Reducing energy and water use during demolition and construction, whilst effectively mitigating air quality impacts;

c. Minimising the amount of materials required;

d. Using materials with low embodied carbon content; and

e. Enabling low energy and water demands once the building is in use.

ii. Require all developments to be designed for:

a. easy maintenance and renovation;

b. flexibility and adaptation; and

c. longer life and facilitating deconstruction for future re-use.

iii. Require applicants to submit a Sustainability Statement with all applications documenting how the requirements set out in criteria (i) and (ii) have been met.

iv. Require new build major applications, or major applications which involve substantial demolition and rebuild, to submit a Circular Economy (CE) Statement, following GLA guidance. The following details must be included in the CE Statement:

a. an accurate record of all the materials used in the building's construction;

b. the proportion of materials and elements reused on-site;

c. materials reused from other sites;

d. recycled materials;

e. new materials by mass and material intensity (kg per m2); and

f. a calculation of the development's overall 'material circularity'.

v. Require applicants needing to submit a Circular Economy Statement (as set out in criteria (iv) above) to explore opportunities to use the site, or other local sites, for the temporary storage of re-usable materials, during the construction phase, to enable other developments coming forward in the locality to use those materials.

vi. Safeguard Camden's existing waste site at Regis Road unless a suitable compensatory waste site is provided that replaces the maximum throughput achievable at the existing site.

1.3 Implementation

Project Team

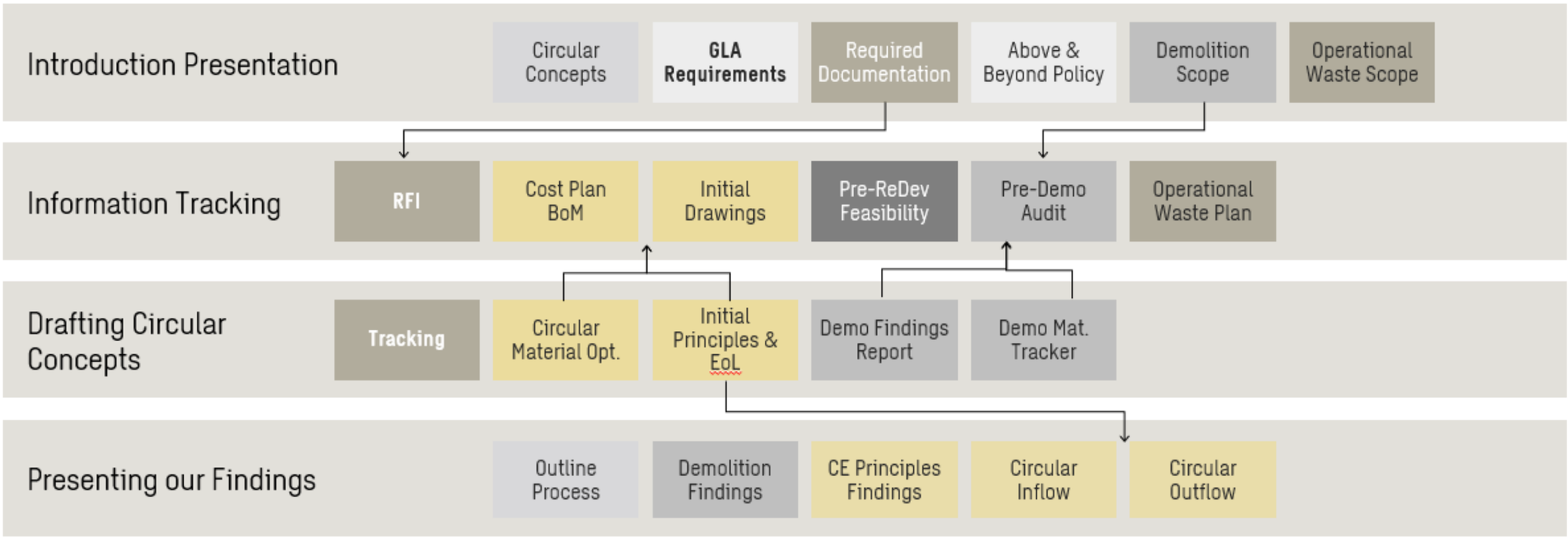
Client	**VREF Shaftesbury SCS**
Development Manager	**Edge**
Project Manager	**B&CO**
Architect	**DSDHA**
Structures	**AKT II**
Façade	**Arup Façades**
MEP	**Sweco**
Sustainability	**Sweco**

In order to ensure that a Circular Economy Strategy is in place during the early design stages of the development, an implementation strategy has been put together to monitor the methodology and practices by the team. Short and medium term targets and commitments will be reported on throughout each stage with long term targets reported as key milestones and aspirations.

To ensure the team were able to set realistic targets for the development, an initial workshop was undertaken on the 23rd May 2024 to provide an introduction to circular economy in the built environment and how this aligns with current policies.

In the circular analysis, the first step is establishing a starting point or initial assumption that will be used to guide the analysis. These initial assumptions could be a set of data with the purpose of setting a starting point to provide a reference for the analysis, which can be used to evaluate the results and conclusions of the analysis. Without the initial assumptions, the analysis may lack direction and coherence, making it difficult to draw meaningful conclusions. This initial analysis was carried out based on the design at a level of detail that of Stage 2. The circular KPIs are typically set during RIBA Stage 2 of the design where concept information is available. At this stage circular concepts are incorporated into the design to prepare for the procurement and technical design process at a later stage. This report provides circular assumptions based on the current design to be developed further as the Proposed Development design progresses. Information regarding the materials and form will be provided with more accuracy during Stages 3 and 4 of the design.

During the later stages of the design, disassembly principles will be fully integrated, and the procurement process will begin. We will liaise with the Contractor and track the waste destinations for reporting. Once at this stage, additional workshops will be logged with the team for monitoring of our approach and commitments.



The Existing Development

2.1 Approach and Methodology for the Existing Development

During the earliest stages of the project, the design team were engaged to highlight the requirements for the existing site and the process to be undertaken guided by the GLA Decision tree for existing buildings outlined in the LPG for Circular Economy Statements (see right). The intention is to retain the existing building on site in part for a major refurbishment.

To ensure material reuse is maximised, Material Index were appointed to undertake the Pre-Demolition Audit which is detailed in the following sections.

The audit aims at creating an asset register of materials to be removed during the deconstruction phase. It primarily emphasises components that can be reused or recycled, whether within the client's portfolio or through off-site options such as resale markets or donation schemes.

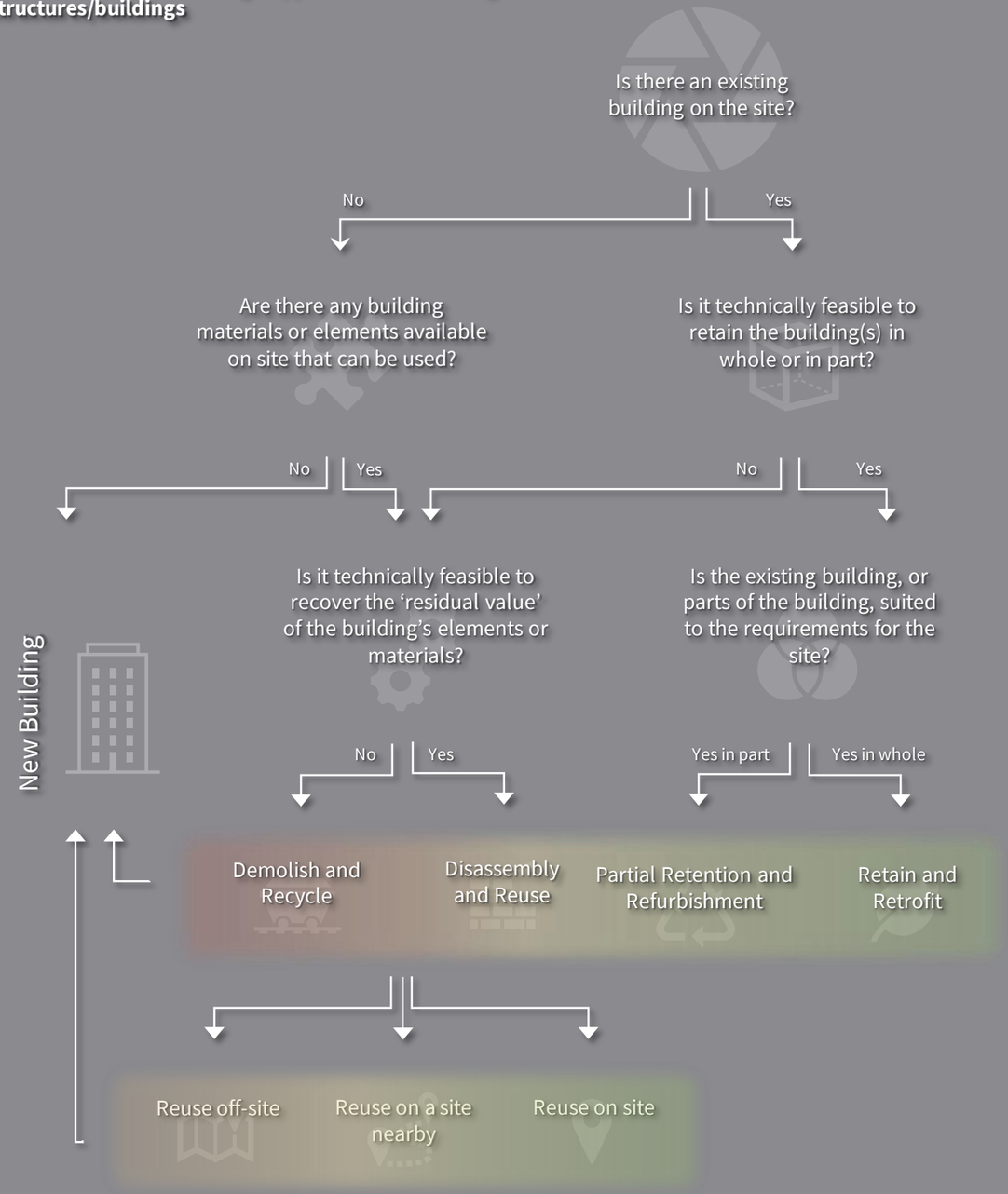
The written report concentrates on these elements, accompanied by an asset register (catalogue) detailing all materials and components identified for removal during deconstruction. This register primarily highlights components suitable for reuse and recycling, both within the client's portfolio and through external resale or donation options.

In addition to the audit, the project team have access to the Material Index online platform, a material management tool designed to align project pathways with the waste hierarchy. This resource is live and can be updated throughout the project stages to monitor sustainability data and targets. The pre-demolition audit report should be considered alongside the broader project sustainability strategy and the pre-redevelopment audit prepared by Material Index.

The report also suggests recycling pathways within the waste stream, aiming to optimise material management in accordance with the principles of the circular economy and the waste hierarchy.

For the full Pre-Demolition Audit please see Appendix C.

GLA Decision tree for design approaches for existing structures/buildings



2.2 Redevelopment Feasibility Summary

This Section sets 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 the report sets 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 the 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 the findings from the Condition & Feasibility Study, 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 Carbon Optioneering Study. 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.

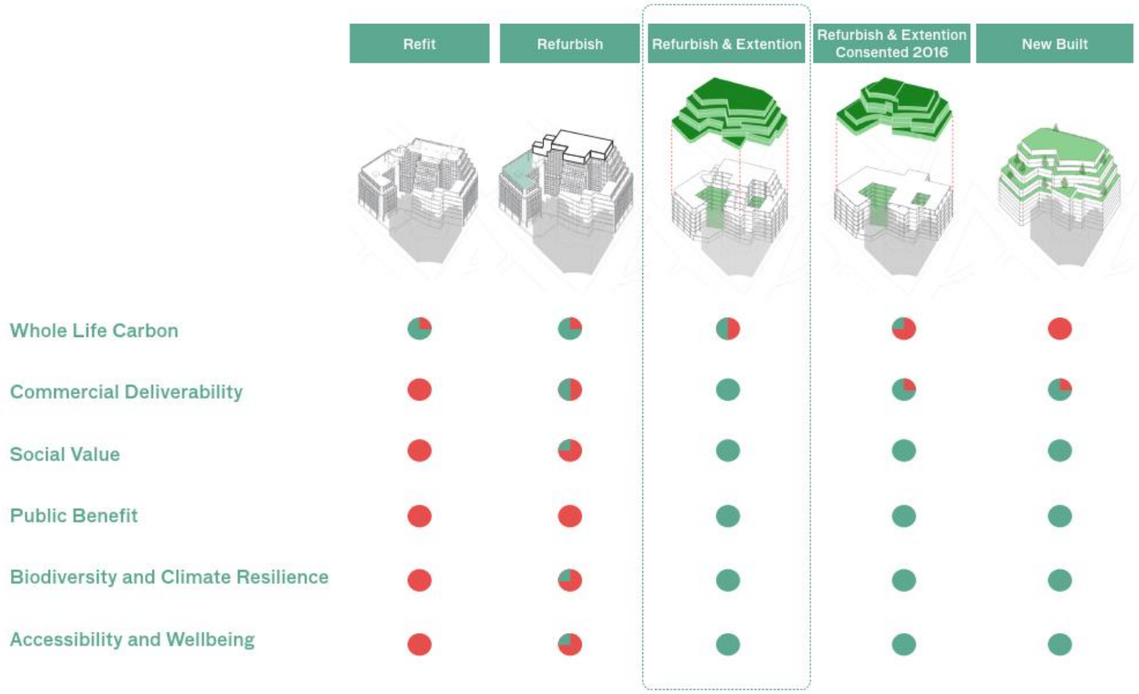


Figure 2-1 DSDHA Stage 2 Retention Options Matrix

2.3 Pre-Demolition Audit Summary

As highlighted in Section 2.1, Material Index has conducted a comprehensive Pre-Demolition Audit for all materials associated with the 125 Shaftesbury Avenue development. This extensive audit has led to the categorisation of materials into four distinct groups: Retain, Reuse On-Site, Reuse Off-Site, and Recycle Off-Site. The estimated waste destinations for all materials on-site are illustrated in Figure 2-2, with the total amount of materials reaching 25,008 tons.

A significant portion of the materials, comprising 74% or 18,478 tons, is designated for retention. This high retention rate plays a crucial role in preventing unnecessary demolition, reducing transport needs, and minimising waste generation. The retained materials primarily consist of structural components, which account for 78% of the total weight of materials on site, as shown in Figure 2-3. Notably, 95% of these structural components will remain in situ, while the remaining 5% is sent for off-site recycling.

Opportunities for material reuse have been categorised into on-site and off-site destinations, amounting to 3,961 tons, or 16% of the total materials available. During the strip-out and demolition phases, the paths for material reuse will be closely monitored to optimise the repurposing of existing materials. The subsequent section, Material Reuse Opportunities, provides a detailed overview of items identified for reuse and discusses their feasibility.

Lastly, the recycling of materials off-site accounts for 10% of the total, equating to 2,569 tons. This recycling is typically necessary when materials have reached the end of their life cycle or when there is no viable method to extract them without incurring damage to the development. Importantly, these materials will be directed away from landfills and instead recycled. The upcoming section, Material Recycling Opportunities, further delves into the specifics of the materials designated for recycling and evaluates their feasibility.

Due to the live online Platform delivered by Material Index, it is important to acknowledge that the figures presented in Section 2 reflect the status at the time of this submission. As the design, strip-out, and demolition processes progress, these figures will be regularly reviewed and updated to accurately reflect any changes in waste destinations. Nevertheless, the overarching targets for diverting waste from landfill will remain consistent throughout these updates. This dynamic approach ensures that the project stays aligned with sustainability goals while adapting to real-time developments.

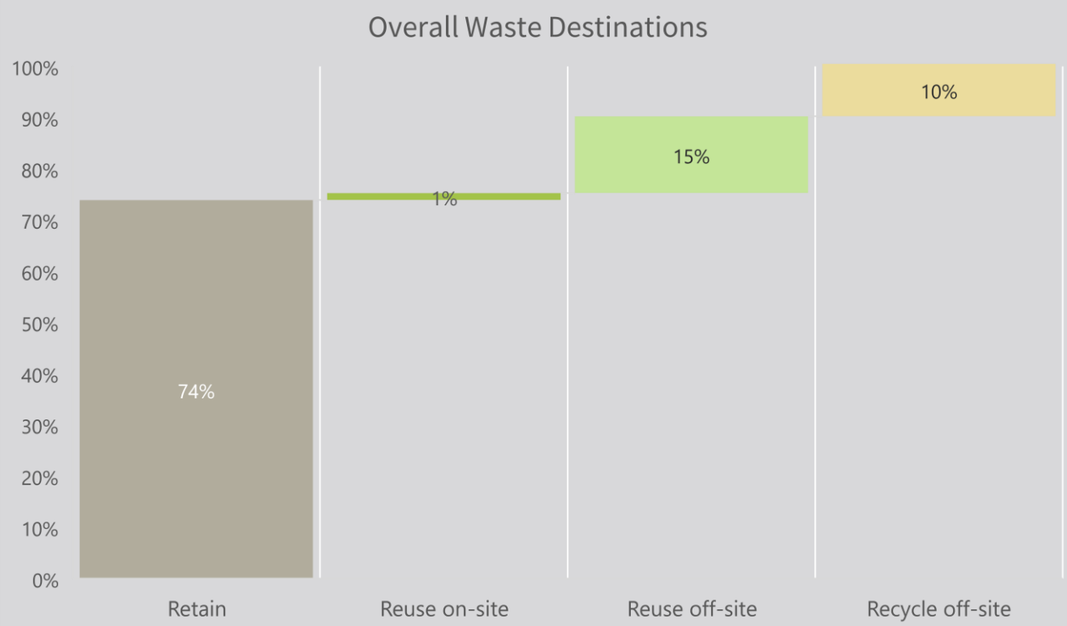


Figure 2-2 Overall waste destinations for all materials by weight (t)

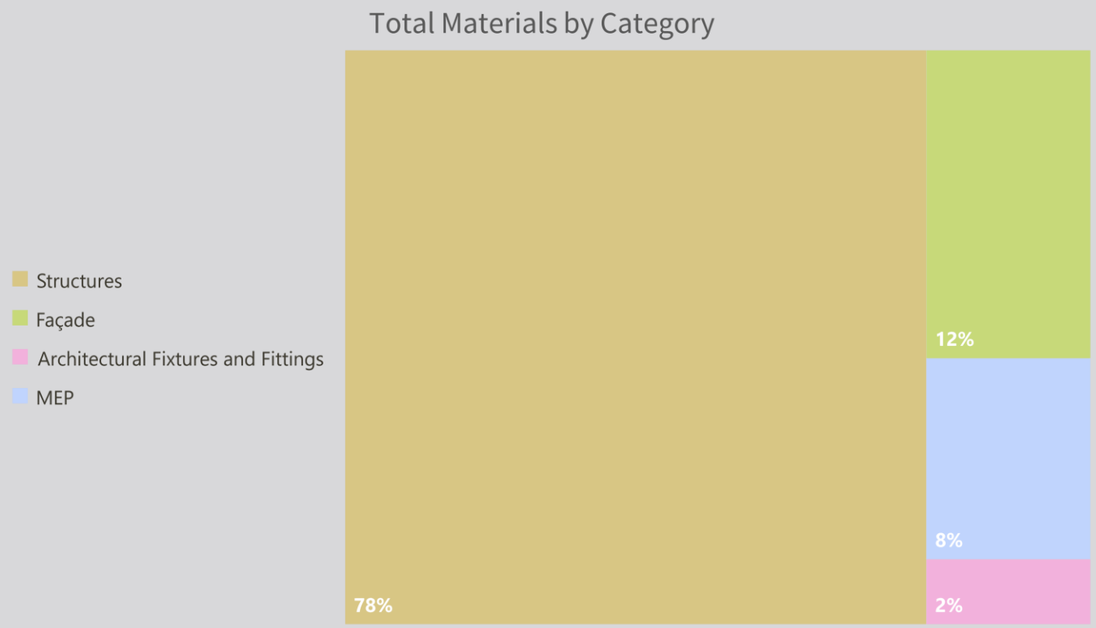


Figure 2-3 Total materials by category by weight (t)

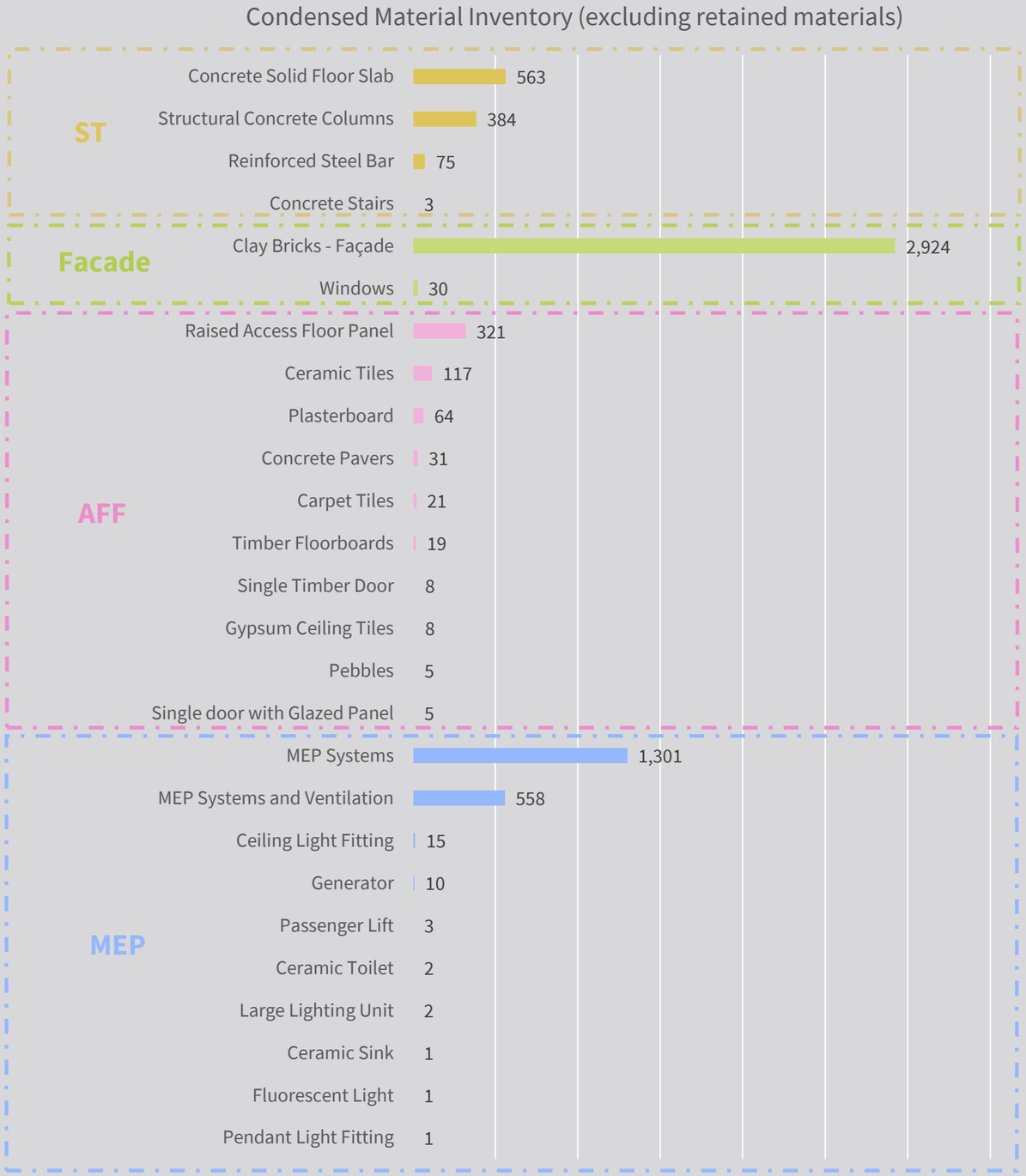


Figure 2-4 Condensed material inventory by weight (t)

Review of the Material Inventory

Figure 2-4 presents a summarised material inventory of the components found within the existing development, as identified in the Pre-Demolition Audit conducted by Material Index. Given the extensive number of materials assessed, only a select group has been highlighted here. The selected items include:

- All identified Structural (ST) materials
- All identified Façade materials
- The top 10 materials within the Architectural Fixtures and Fittings (AFF) category
- The top 10 materials within the Mechanical, Electrical, and Plumbing (MEP) category

It is important to note that materials designated for retention are not included in this list, as they are not classified as waste that will be removed from the existing development for storage or other purposes.

Considering the substantial amount of materials being retained, the structural elements contribute very little to the overall waste generated. Most of the materials in this category consist primarily of concrete, owing to the concrete frame and floor slabs used in the building. The most significant waste item identified is found within the façade, specifically comprising brick-faced precast concrete cladding panels. Additionally, various components from the general MEP systems, including ventilation systems, represent a considerable portion of the materials categorised as waste.

Material Reuse Opportunities

Material Index has identified a substantial quantity of materials from the existing building that are deemed suitable for reuse. This opportunity for reuse is largely attributed to the recent fit-out completed in 2019, which means many of these items have not yet reached the end of their useful life and possess significant potential for further application.

Given the extensive range of materials recognized for both on-site and off-site reuse, a selection of the top 20 items has been highlighted in Figure 2-5. Below is an overview of the feasibility and process for reusing the largest materials by weight:

- **Clay Bricks – Façade:** Initial discussions have taken place between Arup and the Client team to explore options for reusing or recycling existing façade components, either within the building itself or through off-site repurposing or recycling. Currently, these items are designated for off-site reuse, pending review by the project team. If reuse is not feasible, the bricks in the pre-cast panels can be crushed and recycled into aggregate.
- **MEP Systems and Ventilation:** An MEP consultant engaged by Material Index assessed the site and identified ductwork, cable trays, and some fan coil units, along with associated refrigerants, as potentially valuable for reuse. While an overview of the MEP strategy has been provided, the exact condition of the heating system is unclear until an MEP condition survey is completed. After this survey, Material Index can offer recommendations, including potential participation in manufacturer take-back programs.
- **Raised Access Floor Panel:** To secure a sufficient supply for the proposed project, options for storing the existing flooring should be explored. When deconstructing the modular office flooring, careful removal of each module—including pedestals and floor panels—is necessary to prevent damage. These components should be stored on-site and organized into pallets for potential reuse. If on-site reuse isn't feasible, there are various off-site reuse opportunities, including take-back programs offered by the manufacturer Kingspan.
- **Windows:** While there is generally no established reuse market for secondary windows, the window system replaced in 2019 presents potential for off-site reuse, which should be pursued to elevate these items in the waste hierarchy. If reuse is not feasible, the punched windows around the building's facade offer significant opportunities for recycling and upcycling. The following actions can be considered:
  - Recycling of the glazing and aluminium, with an emphasis on whether the outer glazing can be recycled as Class A cullet.
- **Carpet Tiles:** There are significant quantities of office carpet flooring available for reuse, both on-site and off-site. The grey and patterned carpets are generally of good quality, standard size, and commonly used in office settings. Currently, these carpets are designated for on-site reuse, particularly in fit-out areas. To facilitate this, options for on-site or off-site storage should be considered, especially given the substantial refurbishment work taking place.

Figure 2-5 Materials by weight identified by Material Index as having potential for reuse on and off site

Material Recycling Opportunities

As shown in Figure 2-2, 10% of the total materials on site have been designated for recycling. Figure 2-6 provides a comprehensive overview of these materials, some of which overlap with those identified for reuse. In some cases, this overlap accounts for potential damage that might occur during the removal process. The below addresses potential recycling routes for the top materials outlined in Figure 2-6:

- **MEP Systems:** Most components of MEP systems are typically composed of metals and plastics. Once these metals are separated, they can be recycled and transformed into new metal products, thereby extending their lifecycle. This process allows for valuable resources to be reintegrated back into production. On the other hand, recycling plastics presents more challenges, as it requires careful assessment to determine the type of plastic and the appropriate recycling methods. Different plastics have varying properties and recycling capabilities, so it's essential to identify them accurately. To maximise recycling potential, it's advisable to explore take-back schemes offered by manufacturers for various MEP kits. These programs can facilitate the proper disposal and recycling of components, ensuring that materials are effectively recovered and reused. By actively participating in such initiatives, stakeholders can significantly enhance the sustainability of MEP systems and promote responsible waste management practices.
- **Concrete Floor Slabs and Columns:** The options for recycling concrete are somewhat limited, primarily involving the process of crushing the material to create secondary aggregates. This approach, while straightforward, plays a crucial role in diverting concrete waste from landfills. By repurposing crushed concrete as aggregates, it can be effectively reused in various construction projects, thereby reducing the demand for new raw materials. Furthermore, using recycled aggregates can enhance the performance of new concrete by providing added strength and durability.
- **Ceramic Tiles:** Once removed from the existing building, the ceramic tiles can be recycled in various ways. One prevalent method involves crushing the tiles into smaller fragments, which can then serve as aggregate in new concrete mixes or be used as a base material for paving and landscaping.
- **Reinforced Steel Bar:** Once extracted from the building and cleaned of contaminants such as concrete, the steel bar and be melted and reprocessed into new steel.

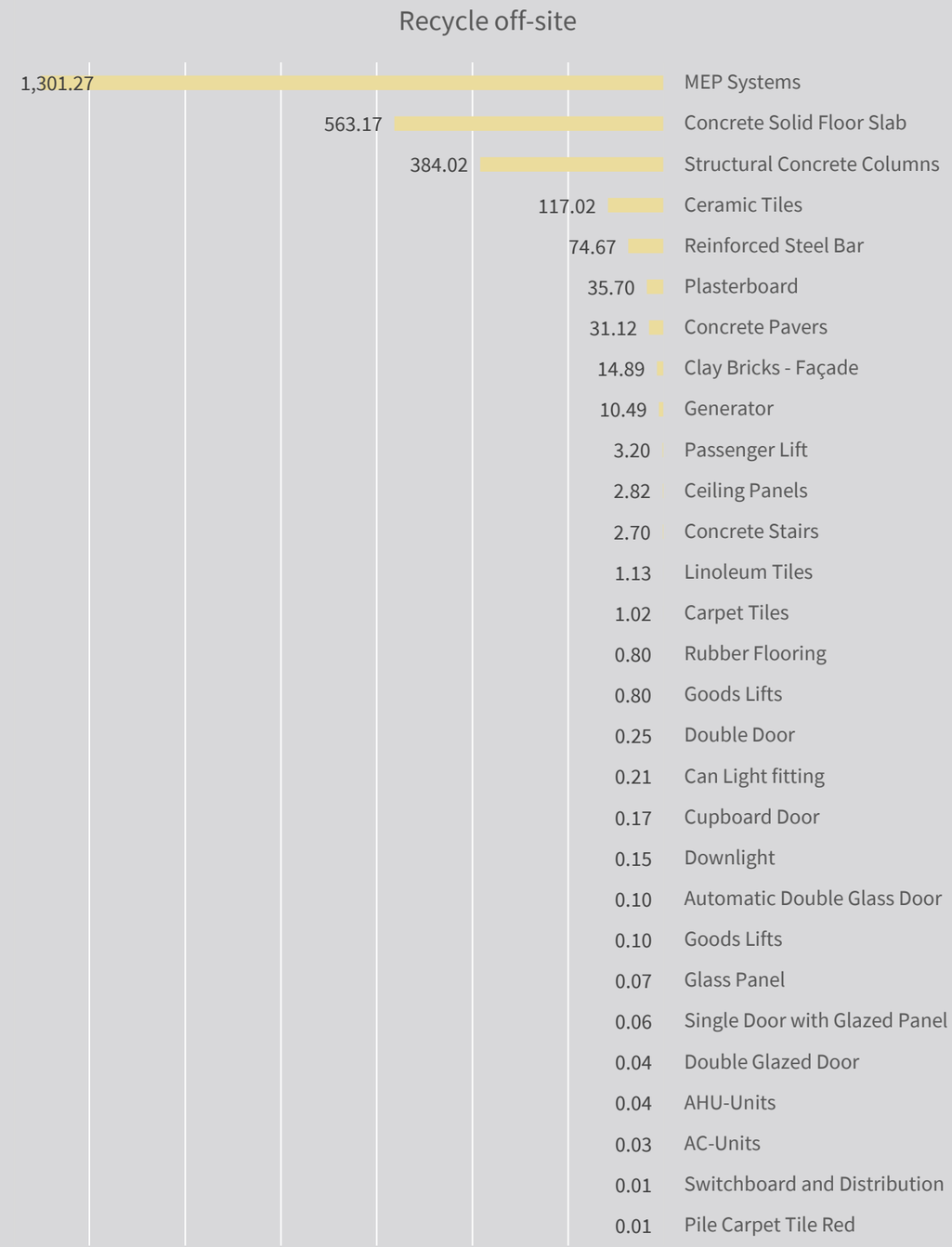


Figure 2-6 Materials by weight identified by Material Index as having potential for recycling