Circular Economy Statement

UP4

Date: 13/03/2026

Report Number: HDR-0474-XX-REP-MD-000003

Project Reference: 10274713

Contents

Tables

Figures

Appendices

Document Control

Issue	Date	Status	HDR Author	HDR Approval	Notes
P01	28/02/2025	Issue	JH, CS, TP	RW	
P02	03/03/2025	Issue	JH, CS, TP	RW	
P03	31/07/2025	Issue	JH, CS, TP	RW	Revised following GLA comments
P04	13/03/2026	Issue	CS	TP	Revised following GLA comments

1 Executive Summary

This report provides the Circular Economy (CE) analysis for the proposed development of the site UP4, at Lands End Bulls Bridge Industrial Estate. This report has been produced in response to the Greater London Authority London Plan Policy SI 7 and follows the Circular Economy Statement Guidance published by the GLA (March 2022) in order to demonstrate a high level of sustainability.

The following targets are set out in the London Plan Guidance for Circular Economy guidance:

Circular economy targets for existing and new developments	Policy requirement	Target aiming for (%)	Policy met?
Demolition waste materials (non-hazardous)	Minimum of **95%** diverted from landfill for reuse, recycled or recovery	98	**Yes**
Excavation waste materials	Minimum of **95%** diverted from landfill for beneficial reuse.	100	**Yes**
Construction waste materials	Minimum of **95%** diverted from landfill for reuse, recycling, or recovery.	98	**Yes**
Operational waste	Municipal Waste[1]: Minimum **75%** recycling rate by 2030. Business Waste[2]: 75% recycling rate by 2030.	75	**Yes**
Recycled content	Minimum **20%** of the building material elements to be comprised of recycled or reused content.	11.9	**No**

The existing buildings at UP4, Union Park, Land at Bulls Bridge Industrial Estate have been assessed (Savills Condition Survey Report, December 2024) as has having low viability for reuse as part of the proposed future development of the site based on the existing building structures overlay with the proposed wider redevelopment plans. In addition, there is limited opportunity to recover the residual value of the existing buildings elements or materials.

The preferred strategy is therefore to construct a new building. The new development will apply the six Circular Economy principles and ensure that reuse onsite and recycling is maximised.

The proposed development has a Building Circularity score of **38 %.**

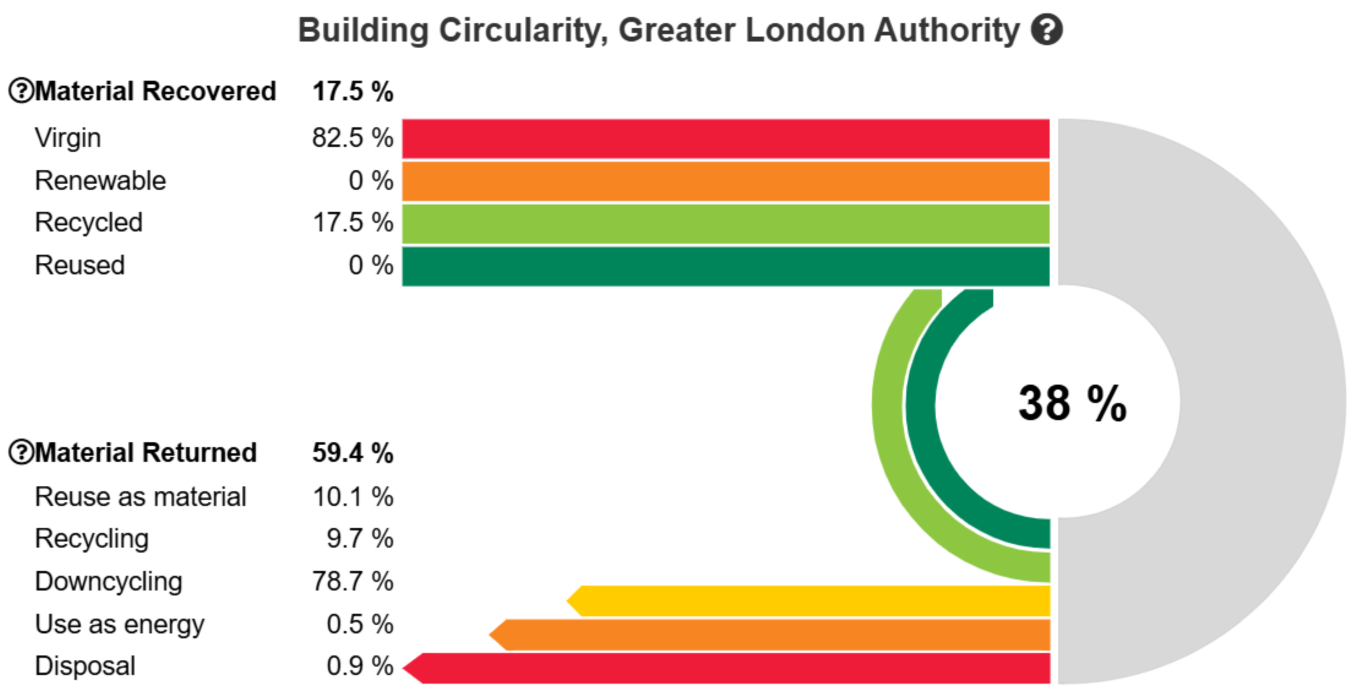

Figure 1: Building Circularity Results

The calculated Building Circularity score represents the total materials circularity both in use of materials for the project as well as end of life handling. It is calculated as the average of Materials Recovered (representing use of circular materials in the project) and Materials Returned (representing how effectively materials are returned, instead of disposed of or downgraded in value. The calculation is purely mass based without material weighting.

[1] Municipal Waste: household waste or business that is similar in composition irrespective of who collects or disposes it. London Environment Strategy, May 2018

[2] Business Waste / Business municipal waste: Business waste is defined as waste generated by businesses that is similar in composition and nature to household waste. This includes waste from shops, offices and retail and hospitality businesses. London Environment Strategy, May 2018

2 Introduction

This Circular Economy Statement has been produced to outline the Circular Economy measures and implementation strategy for the proposed UP4 development at Union Park.

London Plan's Policy SI 7 defines a Circular Economy design approach as one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.

Traditionally the construction industry utilises a linear approach, following the 'take-make-use-dispose' model, where raw materials are extracted, then transformed into products, transported, installed, used and at their end-of-life stage they are disposed as waste. The circular economy moves away from this current linear model to a model where resources are kept in use, their value is retained and materials can be reused, recycled, or remanufactured.

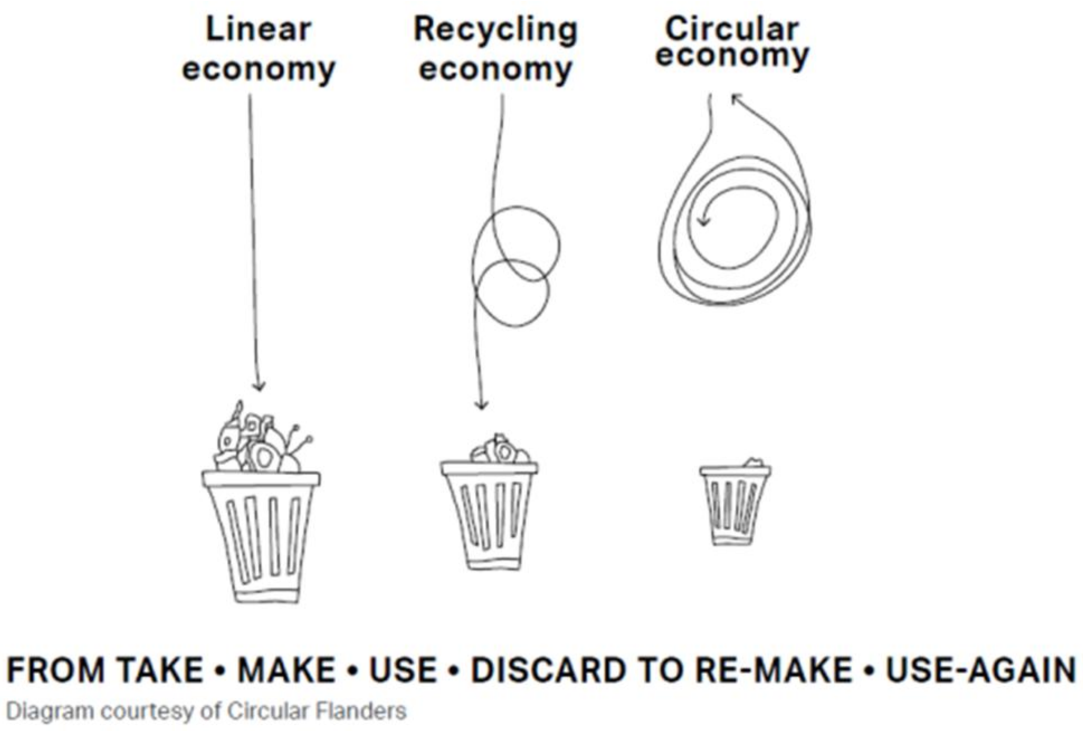

Figure 2: CE model, compared to the linear and recycling economies

This Statement is based on the RIBA Stage 2 planning design and details how the development proposes to incorporate the six Circular Economy principles:

- Principle 1 - Building in layers
- Principle 2 - Designing out waste
- Principle 3 - Designing for longevity
- Principle 4 - Designing for adaptability or flexibility
- Principle 5 - Designing for disassembly
- Principle 6 - Using systems, elements or materials that can be reused and recycled.

CONSERVE RESOURCES (Principle 1)
The proposed development seeks to ensure that material and resource use are minimised as far as possible, in line with the first principle of circular economy: building in layers (to conserve resources and sourcing ethically). The Design team is committed to minimising the quantities of materials and other resources used, as well as ensuring materials will be sourced responsibly during construction.

ELIMINATE WASTE (Principles 2 to 5)
The proposed development seeks to address the second to fifth core circular economy principles by ensuring the design is flexible and adaptable, thereby increasing the building's lifespan and minimising maintenance, and by aiming to reduce construction, demolition, and excavation waste as far as possible.

MANAGE WASTE SUSTAINABLY (Principle 6)
The proposed development will seek to implement the sixth core principle of circular economy by carefully managing demolition, construction, and municipal waste to maximise recycling and reuse and minimise waste sent to landfill as far as feasible.

2.1 Site Description

The development is located at Union Park, Land at Bulls Bridge Industrial Estate, Hayes, UB3 4QQ in the London Borough of Hillingdon. It is located on the Project Union development site and part of a wider development site for a number of data centres. The first data centre block (UP1) and associated energy centre (EC1) is complete and occupied with the other two data centres (UP2 and UP3) and energy centres (EC2 and EC3) under construction.

The site is to be redeveloped to deliver an extension to the existing campus consisting of:

(a) data centre building

(b) energy, power, and water infrastructure

(c) internal roads

(d) site security arrangements

(e) hard and soft, green landscaping

(f) other ancillary and auxiliary forms of development

Figure 3 Existing Site & indicative boundary

2.2 Development Description

The proposed development will include the following:

a) Data Centre Building The proposed fourth block will connect directly onto the western edge of Data Centre Block 3. The intention is for the data centre to have a maximum height of 35m, mirroring that of Data Centre Block 3. The intention for the façade is to draw on the approach for Data Centre Block 2, using cladding panels connected to each other at right angles to create a point that sticks out. Three sets of these will be located vertically above one another with the angle of each set differing to that of the ones above and below it;

b) Ancillary Block – This is conjoined and immediately west of the Data Centre Building. It provides the required support and office space. It is to be glazed with glazing panels separated with dark vertical fins on the southern elevation to reduce solar glare. It is envisaged that roof space will be used for PV panels and brown / green roofing;

c) Energy Centre - An energy centre is proposed to be physically connected to the western edge of the ancillary block. The energy centre will have a maximum height of 28m. The intention is to draw upon the design approach of the three already permitted energy centres, using vertical fins with perforations and orientated in a way to allow views through the façade in some areas (with the use of back lighting adding interest). Darker cladding is to be used then for the Data Centre Building, extending the 'light-dark' pattern across all of the data centre buildings and contrasting with the lighter colour ;

d) Security Measures - Clearly ensuring a high level of security is key for the successful operation of a data centre (and designation of data centres at Critical National Infrastructure only increases these requirements) and the intention is that the permitted fence lines will effectively be extended around the proposed development. No visitor reception centre is required to serve this block whilst the permitted western vehicular lock entrance will be used;

e) Car Parking and Access - The proposal is for the permitted circulation road, which runs around the western edge of Data Centre Block 3, to be extended further westwards to that it continues around the proposed fourth data centre and energy centre before turning back eastwards and re-connecting to the main access and egress into the wider site at North Hyde Gardens Road Bridge.

f) Landscaping – Conjoining Data Centre Block 4 with Data Centre Block 3 and pushing development as close to the railway line as possible leaves two primary areas of Data Centre Block 4 landscaping. Due to the security requirements of Ark and their future occupier, these areas of land are to be located within the secure fence line.

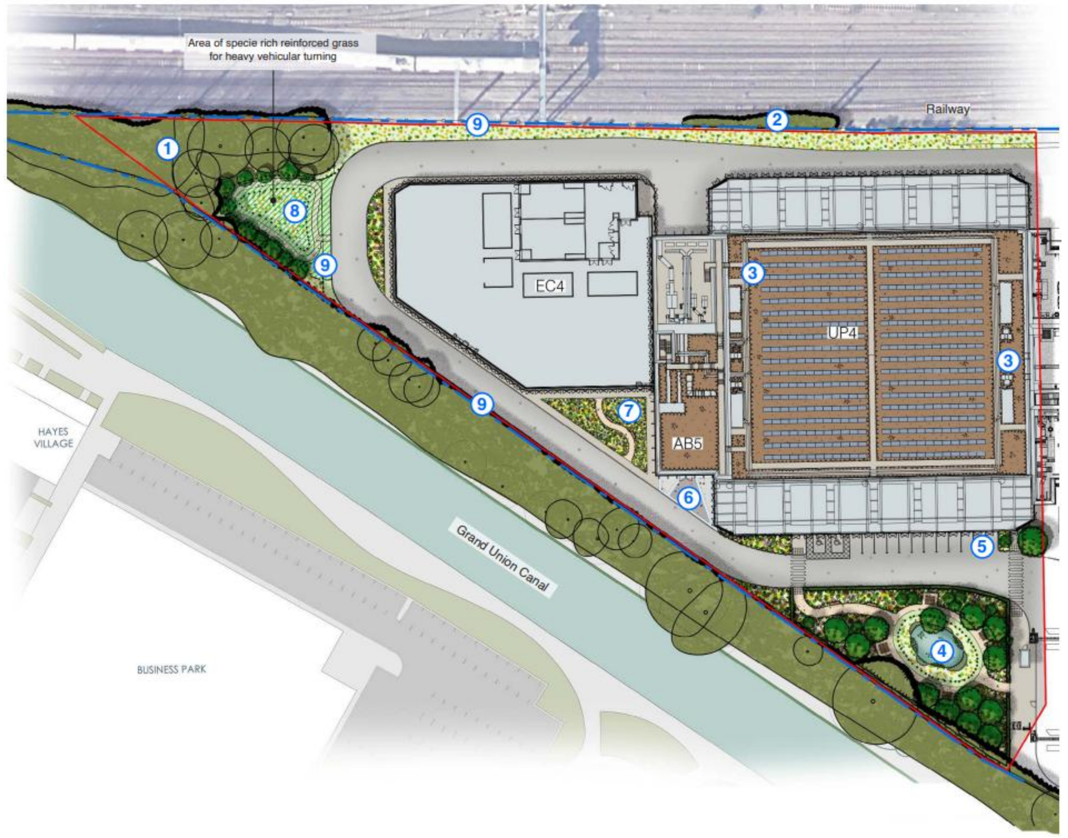

Figure 4: Block 4 Site Plan

The site area is 1.26ha and includes a floorspace of 18,910m^2. The floorspaces are broken down across several floors:

Ground Floor:
- UP4 3,008 m^2, AB5 439 m^2, EC4 320 m^2

First Floor
- UP4 3,008 m^2, AB5 537 m^2, EC4 320 m^2

Second Floor
- UP4 3,008 m^2, AB5 537 m^2, EC4 320 m^2

Third Floor
- UP4 3,008 m^2, AB5 537 m^2, EC4 322 m^2

Fourth Floor
- UP4 3,008 m^2, AB5 537 m^2

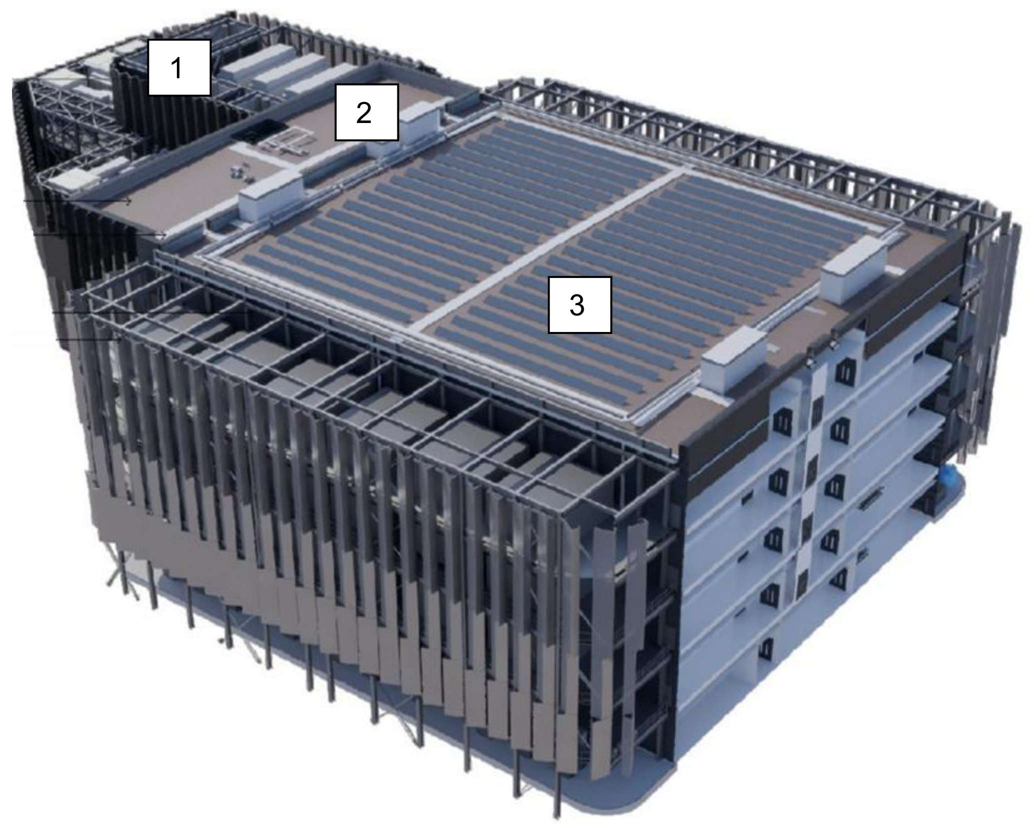

Figure 5: 3D Image Showing 1) Energy Centre, 2) Admin Wing and 3) Data Hall

3 Planning Policies

3.1 Greater London Authority (GLA) London Plan 2021

The London Plan was adopted in March 2021 and sets out the strategic plan for London over the next 20-25 years. This statement responds to the Publication London Plan March 2021 Policy SI7 'Reducing waste and supporting the circular economy'.

This states the following:

Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the mayor's 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*
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*

Policy S1 7 requires referable applications to promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

- *How 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 reused 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 reuse*
- *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*

Policy D3 'Optimising site capacity through the design-led approach' requires developments to aim for high sustainability standards and take into account the principles of the circular economy.

3.2 London Plan Guidance: Circular Economy Statements

The GLA Circular Economy Statement Guidance (March 2022) was prepared to support the London Plan Policy SI7 – Reducing Waste and Supporting the Circular Economy. The guidance explains how to prepare a Circular Economy statement, including the information that must be submitted. The policy also includes guidance on how the design of new buildings, and prioritising the reuse and retrofit of existing structures, can promote circular economy outcomes.

3.3 Hillingdon Local Plan

This Circular Economy Statement also helps support the Hillingdon Local Plan Part 2 (adopted version 16th January 202) – Development Management Policies, Policy DMIN4: Reuse and Recycling of Aggregate.

This states the following:

A) The Council will promote the recycling of construction, demolition and excavation waste.

B) All developments will be encouraged to:

i) recycle and re-use construction, demolition and excavation waste as aggregates.

ii) process and re-use the recyclable material on-site, and where this is not possible, the material should be re-used at another site or for land restoration; and

iii) use substitute or recycled materials in new development in place of primary minerals.

4 Method Statement

A Circular Economy is defined in the London Plan Policy SI 7 'Reducing waste and supporting the Circular Economy' as one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.

For buildings, this means creating a regenerative built environment that prioritises retention and refurbishment over demolition and rebuilding. It means designing buildings that can be adapted, reconstructed, and deconstructed to extend their life and that allows components and materials to be salvaged for reuse or recycling.

Designing buildings for a circular economy can increase their value by avoiding depreciation and can help to stave off obsolescence. It can even secure a positive residual value at end-of-life. In a circular economy, built environment assets are designed so that whole buildings, and materials, components and parts can be continually and easily recycled.

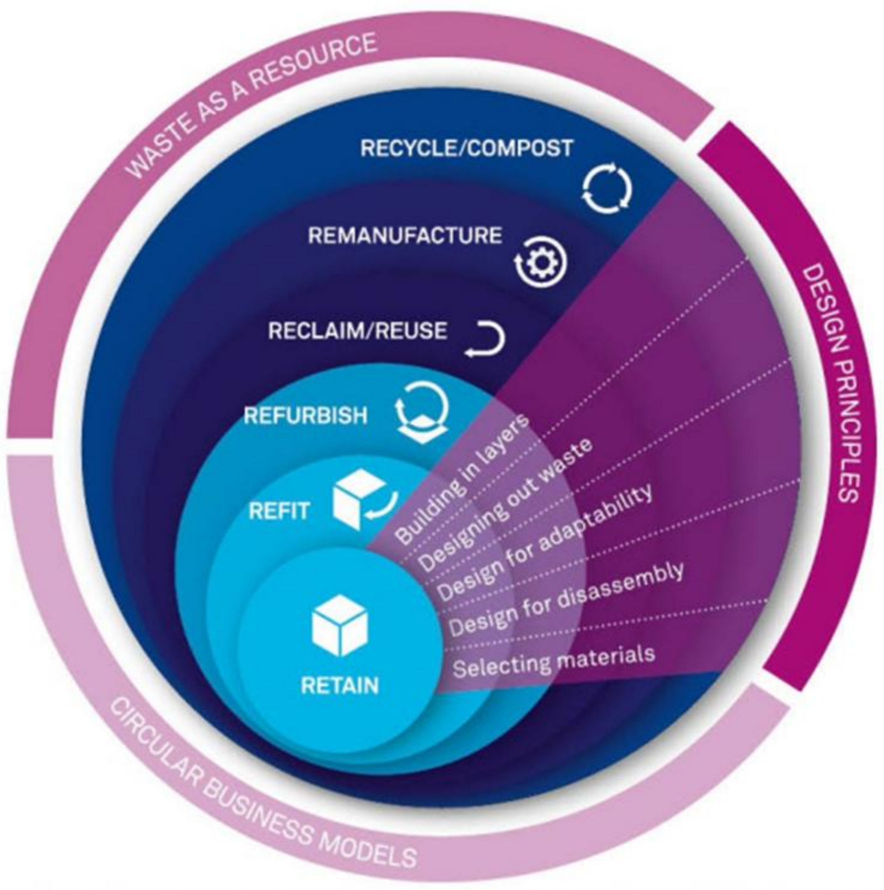

Figure 6 CE hierarchy for building approaches. [3]

4.1 Circular Economy Hierarchy

Redevelopment should be assessed against the following the Circular Economy Hierarchy which is shown across 2 no. decision trees in Figures 7 (Existing buildings) and 8 (New buildings).

4.1.1 Existing buildings

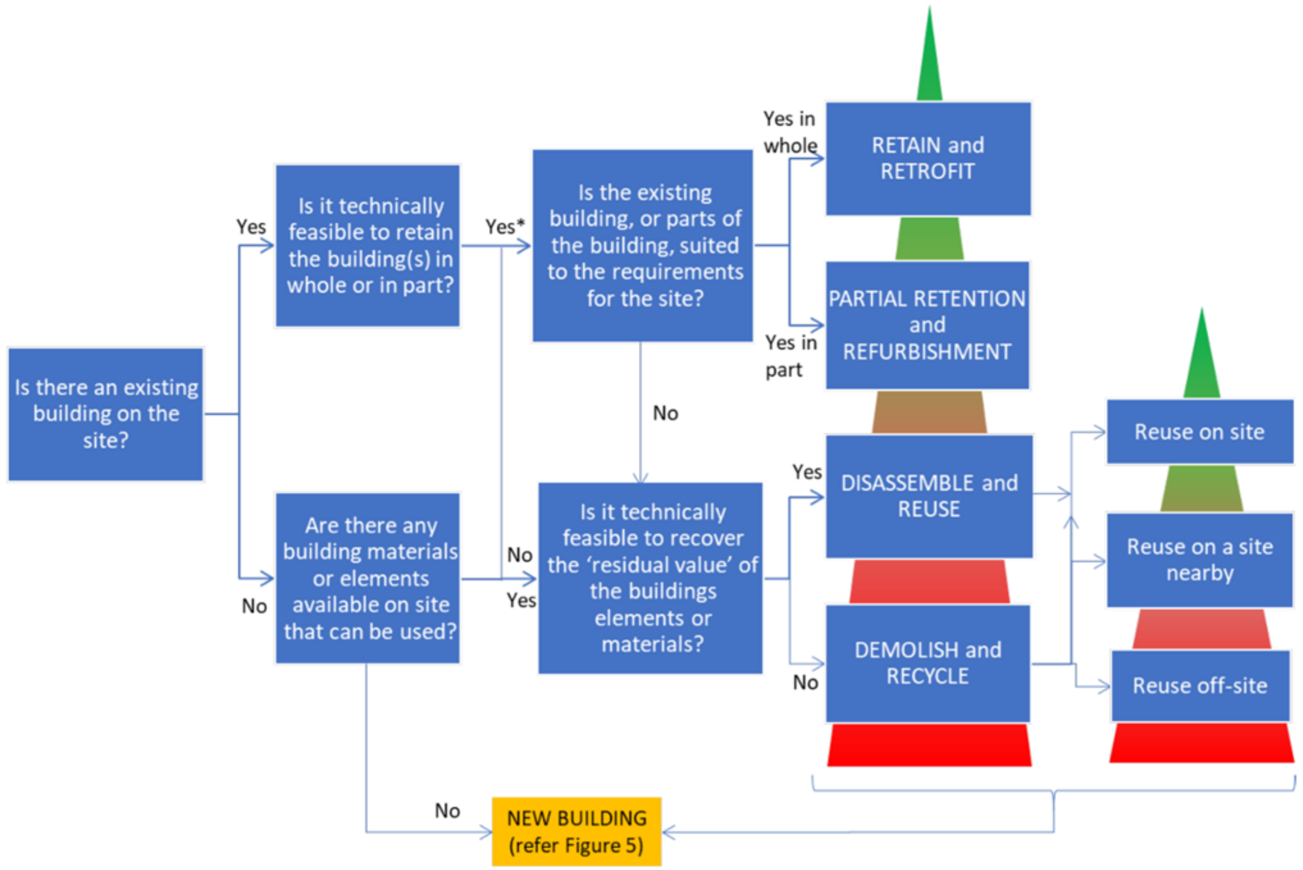

Figure 7 Decision tree for design approaches for EXISTING structures/buildings[4]

1. Refurbishment

The vast majority of the building's fabric is retained, with the building refurbished for the same or new uses through restoring, refinishing and futureproofing.

This also encompasses retrofitting, where new technology or features are added to existing buildings to make them more efficient and to reduce their environmental impacts.

2. Partial retention and refurbishment

Significant quantities of carbon-heavy aspects of the building are retained in place, such as the floors and substructure, with replacement of some elements of the building, such as walls or roofing. More significant refurbishment can involve adding floors or extensions.

3. Disassemble and reuse

[3] Source: London Plan Guidance, Circular Economy Statements March 2022

[4] Source: London Plan Guidance, Circular Economy Statements March 2022

Disassemble sections of a building and enable their direct reuse ideally on the site or, where this is not possible, off site (with nearby sites preferred). This approach also includes careful selective deconstruction of the building and material types i.e., taking apart each layer and material type as much as possible, minimising damage to parts and maintaining their value, and then reusing those elements and materials. If reuse is not possible, materials may be carefully and selectively separated for processing and recycling into new elements, materials, and objects.

4. Demolish and recycle

Traditional demolition, with elements and materials converted into new elements and materials and objects for use on the site or on another site nearby.

4.1.2 New buildings

The 'decision tree' flow chart shown in Figure 8 can be considered to identify the most appropriate strategic approach for new buildings.[5] The chart aims to maximise residual value in any existing buildings and to add value over the lifetime of the development.

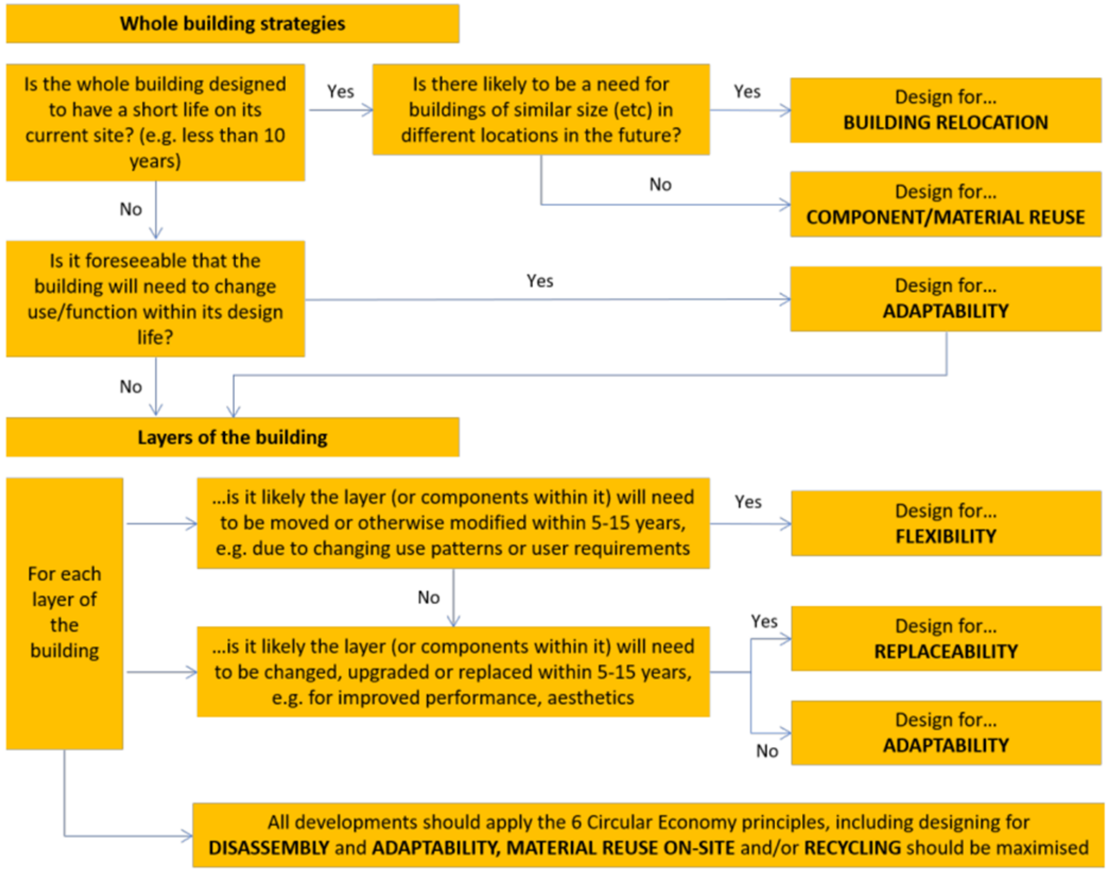

Figure 8: Decision tree for design approaches for NEW buildings, infrastructures and layers over the lifetime of development

[5] Source: London Plan Guidance, Circular Economy Statements March 2022

Building layer strategies have been developed, rather than a whole building strategy. This is because the building is not designed to have a short life, and it is not anticipated that the building will need to change use/function within its design life. The design team have sought to ensure that the new build elements are designed to be long lasting, adaptable, and flexible, and be easy to disassemble.

4.2 Sustainable third-party certification

A BREEAM assessment is being undertaken by Build Energy, using the BREEAM Data Centres 2010 methodology. Many issues relating to BREEAM criteria can influence the circularity of a building.

4.3 Circular Economy workshops

A series of workshops with key stakeholders have been undertaken during RIBA Stages 0-2 to develop the sustainability strategy for the development.

18 November 2024: Whole Life Carbon & Circular Economy Workshop

- Architects: Studio NWA
- Structures: HDR
- Cost Consultant: Ridge
- MEPH: HDR / Grattes Brothers
- Sustainability: HDR
- Landscape Architect: Murdoch Wickham
- Contractor: Sweet Projects
- Project Management: Ridge

A copy of the workshop presentation can be found in Appendix F.

19 February 2025: Circular Economy Workshop

- Architects: Studio NWA
- Structures: HDR
- MEPH: HDR
- Sustainability: HDR
- Contractor: Sweet Projects
- Data Hall Designers: BladeRoom Data Centres

5 Circular Economy Targets

5.1 Circular Economy targets

To enable effective implementation of Circular Economy principles, the following targets, as defined in Policy SI 7 of the GLA Plan 2021 should be met or exceeded.

Table 1. Circular Economy Targets
From GLA circular economy statements template

Circular economy targets for existing and new developments	Policy requirement	Target aiming for (%)	Policy met?	Explanation (How will performance against this metric be secured through design, implementation, and monitoring?)
Demolition waste materials (non-hazardous)		98	**Yes**	The Pre-demolition audit undertaken by Tilley & Barrett Demolition identifies key demolition materials, the potential waste routes and a key target to achieve at least 95% diversion from landfill of non-contaminated waste, with an aim for zero waste to landfill for non-hazardous waste. To manage demolition waste materials, the design team will integrate waste minimisation strategies focused on architectural salvage and meet recycling targets (Site Waste Management Plan, July 2025). On-site segregation and dedicated storage spaces are expected to increase recycling rates. Efforts will be made to recycle materials on site with any surplus being taken to a waste transfer station. Identification of local waste management contractors for each waste stream has also been considered to support implementation (Pre-Demolition Audit, Feb 2025).
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.	100	**Yes**	For excavation waste, the groundworks contractor will process 100% of excavated materials (clay, etc.) for reuse, subject to analysis. Performance will be monitored to ensure high rates of reuse and recovery (Site Waste Management Plan, July 2025).
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling, or recovery.	98	**Yes**	For construction waste, it is expected that the steel fabricator will reuse and recycle all steel materials. Hardcore (crushed concrete) will be 100% recycled, and 80% of timber used for temporary works will be reused. Efforts will be made to salvage reusable timber for hoardings, battening, and shuttering on-site (Site Waste Management Plan, July 2025). 29% of waste is expected to be reused (offsite), 56.8% is expected to be recycled (off-site), 12.7% will be recovered (combined with recycling in the GLA template) and only 1.5% is expected to go to landfill and/or energy recovery. Therefore, the target of 95% of waste to be recycled / reused or recovered is expected to be met. A target of 95% diversion from landfill (excluding energy recovery) has been stated in the SWMP.
Operational waste	Municipal Waste[6]: Minimum 65% recycling rate by 2030. Business Waste[7]: 75% recycling rate by 2030.	75	**Yes**	The HDR Delivery and Service Management plan outlines the expected waste quantities and strategies. This confirms that 75% of waste is likely to be recycled (food waste / mixed recycling). The recycling rate meets the 65% municipal waste and the 75% business waste
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	11.99 (24.5% exc. MEP)	**No**	Recycled content calculations have been undertaken based on cost information provided by the Cost Consultant (Ridge & Partners LLP). Recycled content should be reviewed as the design progresses with recycled content clearly stated in specifications. Manufacturers literature confirming recycled content should also be provided where relevant. Recycled content has been stated both including and excluding MEP plant items. Due to the specialised nature of a datacentre building, the plant items are disproportionately expensive in comparison to a more standard building type. Details of recycled content in plant items is not yet known so assumed as zero. These calculations can be updated once specific plant has been specified and manufacturers data is known.

[6] Municipal Waste: household waste or business that is similar in composition irrespective of who collects or disposes it. London Environment Strategy, May 2018

[7] Business Waste / Business municipal waste: Business waste is defined as waste generated by businesses that is similar in composition and nature to household waste. This includes waste from shops, offices and retail and hospitality businesses. London Environment Strategy, May 2018

6 Design Appraisals

6.1 Design approach for existing buildings

The current structures at Block 4, Union Park, Land at Bulls Bridge Industrial Estate have been assessed (Savills Condition Survey Report, December 2024) as has having low viability for reuse as part of the proposed future development of the site based on the existing building structures overlay with the proposed wider redevelopment plans. This is outlined in the table below.

The existing structures are of a poor-quality construction and would require a disproportionate amount of resource to incorporate within the proposed scheme. It is not technically feasible to retain the existing buildings in whole or in part, nor is the existing building suited to the requirements of the proposed development.

Using the Decision Tree for design approaches for existing buildings / structures, it is not technically feasible to retain the existing building on site. There is also limited opportunity to recover the residual value of the building elements. Therefore the preferred strategy is NEW BUILDING.

Table 2: Circular Economy Design Appraisal – EXISTING Structures

Circular Economy Design Approach	Phase/Building/ Area/Layer	Strategic Response
Refurbish	Structure Systems	The UP4 development will not retain or retrofit the existing building due to structural and service-related issues. Structurally, the existing ancillary and office block are unsuitable in size and load capacity for the new building matching those on the Arc Data centre. The warehouse's foundation size and bearing capacity are also inadequate. The existing buildings have no external amenity areas, thereby reducing the opportunity to increase the biodiversity of the site, or to provide amenity areas for the benefit of future building users. The lack of external space would also impact on the provision of a new substation on the site, which would be required to provide the electrical loadings for the building users. This cannot be accommodated within the existing building envelope. The existing building sizes would provide limited useable floor areas which is below the area desired by the client in order to optimise the site. The existing building services systems are not suitable for re-use within the new development due to their age, limited size, and capacity. The MEP services of the existing building will produce a greater carbon footprint compared to modern systems. The proposed light industrial and flexible laboratory areas would also require enhanced levels of ventilation, including additional filtration, and low leakage ductwork. These requirements also cannot be met through the retention of existing building services.
Repurpose	Structure	Most existing materials currently on site are unsalvageable due to deterioration, demolition, and replacement by modern, energy-efficient materials. However, the existing steel frames may be adaptable because their design is based on a grid system. Additional columns and beams may be installed to extend a framed building relatively simply.
Disassemble / Deconstruct and Reuse	Structure Shell / Skin Services	The Pre-Demolition Audit considers various options for reuse of existing building materials. The structural steel columns and beams of the building frame have a high recovery potential. Collaboration between Cleveland Steel / EMR would be required prior to demolition for identification of steel sections for recovery and implementation of removal strategies to minimise damage. Metal sheeting on the façade and stair handrails can be recovered for resale through Cleveland Steel. Handrails can be unbolted during the soft strip phase. The metal sheeting will be cut in sections and lifted down by the crane. An estimated 40% of the carpet tiles will be in good condition for reuse following removal. If in good condition once removed, sanitary installations may also be reused. Internal fire doors may also be easily removed and reused. Consideration should be given to furniture for reuse, such as via donation to a local charity. Finally, the materials and services from the existing building, such as concrete, glass, metal and bricks can be recycled for reuse in the future.
Demolish / Deconstruct and Recycle	Structure Shell / Skin Services	The demolition of the subject building and construction of the new building will decrease its long-term carbon footprint with the use of 100% renewable energy, eliminating use of diesel, gas generators, rainwater harvesting and solar power. The existing services generally date back to the original construction of the building and, as such, they are likely to become life expired or in need of significant overhauling in the coming years. The approach for various materials on site will be to demolish and recycle. Where reuse is not feasible, elements will be segregated and processed into new material for use on another site. Steel, brick/blockwork, glass and tiling/ceramics are considered for recycling, where feasible.

6.2 Design approach for new buildings, infrastructure and layers.

The new building is not designed to have a short lifespan on its current proposed site and is being designed for a particular use, therefore is unlikely to change its use within its design life. **Therefore, there is no overall preferred strategy.** The development should therefore apply the six circular economy principles, including Designing for disassembly and adaptability, material re-use on-site, and maximising recycling. Each layer of the building will consider adaptability as well as the applicable strategy. The following table will summarise the Circular Economy Design Approaches for New Buildings.

Table 3 Circular Economy Design Approaches for New Buildings

Circular Economy Design Approach	Phase/Building/ Area/Layer	Strategic Response
Building relocation	n/a	The new building is designed to have a 50+ year lifespan and has been designed for the site. Designing for building relocation is not seen as applicable.
Component or material reuse	n/a	The new building is designed to have a 50+ year lifespan and has been designed for the site. Designing for component or material re-use is not seen as applicable.
Adaptability	Site Structure Services	The new building is designed for adaptability through several key features. Flexible open spaces, including gardens and brown roofs, allow for various landscape uses. The substructure and ancillary block can accommodate different development types and changes in use, subject to structural redesign. Internal elements can be removed, recycled, or reconfigured. Enhanced ventilation systems consider potential effects of climate change to ensure the building remains functional and comfortable over its lifespan.
Flexibility	Site Structure Services	The building is designed for flexibility by creating spaces and systems that can easily adapt to future needs. Open spaces and adaptable brown roofs allow for versatile landscape options. The substructure and ancillary block could support different development types and uses, with potential redesign if needed, given that the structural load is not exceeded. Internal elements, such as partitions and services, are designed for easy removal and relocation. Centralised service risers all for individual system alterations without affecting other systems, ensuring the building can respond to changing requirements over time. Enhanced ventilation and consideration for future climate change supports flexibility by allowing changes required to ensure occupant comfort.
Replaceability	Structure Shell / Skin Services	The building design emphasizes replaceability by being designed in layers, ensuring elements with varying lifespans can be replaced as needed. The superstructure, primarily manufactured off-site, allows for internal items to be stripped out, removed, and recycled, aiding in maintenance and replacement requirements. Structural elements, such as steel, are chosen for their durability, with plant replacement and access addressed early in design. Cladding elements are designed for dismantling and reuse, with materials such as steel and wood flooring having high recovery potential for recycling. The MEP strategy includes disassembly and replacement of items, with large plant equipment on roofs for crane access.
Disassembly	Structure Shell / Skin Services	Design measures for disassembly include the use of block paving, modular construction, and appropriate materials for reuse. Block paving allows for easy maintenance and access to underground services. Steelwork can be disassembled for reuse or recycling. All building skin elements are suitable to disassembly. The facility's modular construction allows for deconstruction and relocation if necessary. The MEP strategy includes disassembly and replacement of items, with large plant equipment on roofs for crane access, minimising architectural disruption.
Longevity	Structure Shell / Skin Services	The new building is designed for longevity, demonstrated through major elements selected for their strength, robustness, and durability, such as concrete metal deck and steel with corrosion protection. Regular maintenance is essential to meet or exceed the lifespan of these elements. The design includes clear access for plant maintenance, with a perimeter road facilitating maintenance needs. The MEP design specifies plant with a lifespan of 20-25 years, and high-quality construction materials will support durability and potential reuse. A comprehensive maintenance strategy will be adopted, which has already been implemented on the other blocks.

7 Circular Economy Principles

7.1 Circular Economy principles

This statement seeks to detail how the development proposes to respond to the six Circular Economy principles:

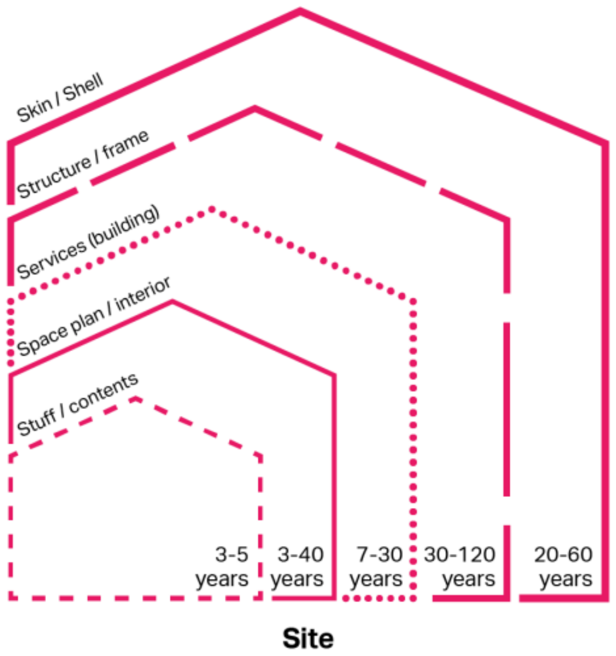

Figure 9 Building Layers and their indicative lifespans [8]

7.1.1 Principle 1 – Building in layers

Ensuring that different parts of the building are accessible and can be maintained and replaced where necessary.

Development response:

The majority of the development will be designed for adaptability within the building layers, and the Design Principles by Building Layer table within the GLA template has been completed to demonstrate where the project has gone beyond standard practice. The overall design of the building has been focussed around building in layers to ensure that elements with longer lifespans can be used to their full lifespan potential. This is observed particularly in the superstructure, which follows the approach of manufacturing the majority of the data centre build off-site. The structural design is such that the internal items could be stripped out, removed and recycled. This aids in the ability to maintain and replace internal items when necessary. Additionally, plant replacement and clear access routes have been established as part of the design. Riser locations have been considered to mitigate service transfers on floors.

7.1.2 Principle 2 – Designing out waste

Ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and re-use of secondary products and materials.

Development response:

The superstructure for the entire development will consist of steelwork, which by its nature is prefabricated off-site for assembly on site. The “factory-first” approach undertaken means that over 60% of the datahall build takes place off-site, dramatically reducing site waste and carbon footprint. The off-site build process, delivered using accredited ISO 14001 standards, reduces the number of deliveries, and construction components on site. In doing so the waste generated is dramatically reduced as precision engineered components arrive on site for installation.

The skin of the building is proposed to be constructed with the following:

a.) **Insulated composite panels.** These span from column to column achieving their maximum available span to avoid cuts off. They arrive cut to measure to site (if required).

b.) **Glazing curtain wall system**, consisting of aluminium mullions and glazed panels, all delivered to site in their required size/measure.

c.) **Multilayer roof system**, delivered to site pre-sized.

Regarding services, the use of pre-fabricated elements will be considered as the design progresses. Ready-made solutions for internal applications will be specified where possible, such as the composite internal aluminium partition system.

Additional measures for designing out waste includes a Site Waste Management Plan that will be provided and reviewed by the appointed project environmental coordinator. Modular construction off-site will be used to reduce waste, and contractors will consider on-site storage and ‘just in time’ deliveries to avoid wastage. Bespoke plasterboard sizes will be used for areas above 50,000m². Where possible, prefabricated pile cages and utility modular elements will be considered to minimize waste and enhance safety. Early engagement with social enterprises or community wood recycling teams will encourage material take-back schemes and increase reuse. Circularity and closed-loop methods will be promoted for applicable products like Protec protection material.

7.1.3 Principle 3 – Designing for longevity

Designing to avoid a premature end of life for all components through considering maintenance and durability.

Development response:

All major building elements have been designed with a long (50+ year for superstructure elements and 25+ years for shell/skin) lifespan. Regular maintenance should be provided to ensure that the life spans of elements and services are met or exceeded.

For structural elements, reinforced concrete is selected for its strength, robustness and durability. All materials are selected with durability and longevity in mind. Steel has been selected for its strength, robustness and durability, with appropriate corrosion protection system. Concrete metal deck has

[8] Source: London Plan Guidance, Circular Economy Statements March 2022

been selected for its strength, robustness and durability within the ancillary building environment. Plant replacement and clear access have been established as part of the design. There is good access to the roof and the building is surrounded by a perimeter road that allows maintenance. The client has implemented a comprehensive maintenance strategy on other blocks with the same development and this will be adopted for UP4 (this block).

MEP design specified plant is in accordance with best practice and seeks to specify plant with a lifespan of 20-25 years. Lastly, the use of high-quality tools and materials for construction processes will ensure longevity and allowing reuse on other sites. Regular maintenance will also be undertaken to prolong the lifespan of equipment.

7.1.4 Principle 4 – Designing for adaptability or flexibility

Designing with thought to how a building might be easily altered to prolong its life, for instance by alteration, addition, or contraction, to suit new uses or patterns of use.

Designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants.

Development response:

The GLA Guidance for Circular Economy Statements (March 2022) notes, “Where adaptability is selected as a design approach, information should be submitted showing how the building can be adapted for different uses.” However, the building is not designed to have a short lifespan on its current proposed site and is being designed for a particular use, therefore is unlikely to change its use within its design life. It has been considered throughout the building layers in the following ways.

Flexible open space is provided in the form of gardens (southern wellbeing garden and western garden with the woodland), which offers an opportunity to adapt the landscape design for different uses. Brown roofs have been designed into the roofscape but could be adapted for other purposes in the future.

The substructure can be used for other development types without modification (if loads are not exceeded). Partial breakout and new construction are possible for the substructure but is subject to redesign by a structural engineer. The ancillary block steelwork and concrete metal deck can be adapted for a change in use if the new design loads are appropriate , also subject to redesign by a structural engineer.

Internal items can be stripped out, removed, and recycled. A maintenance manual will be developed to explain how the building should be maintained, serviced, and eventually disassembled and deconstructed in stages, along with potential alternatives for adaptation.

The design includes a 6.2m floor-to-floor span and high structural design load, allowing for additional mezzanines. Long beam spans create flexible space for different uses. Internal partitions can be removed or relocated, and services are designed in central risers for flexibility.

Enhanced ventilation rates and increased outdoor temperatures are considered to account for climate change effects over the building’s lifespan. Services are designed for specific functions, serving specific locations, and can be altered individually without affecting other systems. If there were to be changes in the future these individual units could be altered, without affecting the installation of other systems within the development.

7.1.5 Principle 5 – Designing for disassembly

Designing to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling.

Development response:

Design measures for designing for disassembly include use of block paving, appropriate materials for reuse/recycling, modular construction, and locating plant appropriately.

The feature paving area using block paving, allowing blocks to be lifted and reused during maintenance or for accessing underground services. The large vehicle turning head is designed with reinforced turf to extend landscaping areas, which can be reseeded as required over time.

Reinforced concrete, being an in-situ material, cannot be disassembled. Steelwork can be disassembled for reuse or recycling, while recycling concrete metal decks is challenging due to their shallow slabs and bonded metal decks, though broken concrete might be used for fill. All building skin elements are suitable to disassembly.

The facility’s modular construction allows for deconstruction and relocation if necessary. Most components making up the data hall structure and fit out could be recycled – such as the structural steelwork which makes up the main elements of the structural design. A detailed manual will be developed to guide maintenance, servicing, and staged deconstruction, with potential re-fit and adaptation alternatives.

The MEP strategy includes disassembly and replacement of items as needed, with large plant equipment located on roofs for crane access, minimizing architectural disruption. A detailed plant replacement strategy will be further developed in later stages. The building layout allows for the replacement or removal of internal parts, with sufficient gauge routes provided.

7.1.6 Principle 6 – Using systems, elements or materials that can be reused or recycled.

Development response:

The majority of materials used can be recycled at the end of their life. Steel, copper, and aluminium are the predominant materials used for services installation, which can be readily recycled at the end of their life. Reinforced concrete can be broken down into its component parts for reuse, with steel being repurposed and concrete used as fill material. Steelwork is designed for disassembly, featuring bolted connections that can be undone to release beams or columns for reuse or recycling. However, recycling concrete metal decks is more challenging due to their shallow nature and the adhesion of the metal deck to the concrete. Some broken-out concrete can still be used for fill and other purposes.

Designing for a disassembly is a key aspect of development, which has been recognised by the design team. The facility’s modular construction allows it to be deconstructed and relocated if necessary. Internal items can be stripped out, removed, and recycled, making the space adaptable for other high-end industrial uses. Most components of the data hall structure, including structural steelwork, can also be recycled. A detailed manual will be developed during the design phase to guide maintenance, servicing, and staged deconstruction, as well as outlining potential alternatives for refit and adaptation.

All cladding elements are designed to be dismantled and reused on other constructions, either onsite or elsewhere, following manufacturers' recommendations. Plant and internal components are specified for modular disassembly and replacement, facilitating recycling and reuse. Temporary materials, such as hoardings, can be recycled or reused at the end of their useful life. Additionally, materials like metal, structural steel, windows, doors, wood flooring, aluminium, and plasterboard have high recovery potential and can be dismantled and recycled for repurposing or remanufacturing.

For construction methods, consideration will be given to companies that participate in take-back schemes, and donation of excess materials to local community schemes.

8 Implementation and supporting evidence

8.1 Plans for implementation

It is proposed that the following actions are taken to implement and monitor the actions included in this circular economy statement:

- That a manual is developed and provided to future building owners, managers, and occupiers, which explains how the modular structures will be deconstructed.
- Information will be stored by using Building Information Modelling, detailed drawings and specifications and the O&M manual during the building's life to support monitoring efforts and facilitate disassembly when required.
- Several related BREEAM credits contribute to responsible material selection, sourcing, and management:
  - Mat 01: Six Credits + Innovation Point is targeted for Mat 1: Materials Specification in BREEAM Data Centres 2010. This issue aims to recognise and encourage the use of construction materials with a low environmental impact over the full life cycle of the building. The external walls, windows, roof, upper floor slabs, internal walls, and floor finishes/coverings are assessed in the Mat 1 Calculator.
  - Mat 05: Three Credits are targeted for Mat 5: Responsible Sourcing of Materials in BREEAM Data Centres 2010. The aim of this issue is to recognise and encourage the specification of responsibly sourced materials for key building elements. A study will be undertaken to demonstrate that 80% of applicable materials are responsibly sourced, comprising building elements including the structural frame, ground floor, upper floors, roof, external walls, internal walls, foundation/substructure, and staircase. A calculation will be carried out to determine the number of credits awarded. This credit also requires that all timber will come from a legal source, and one not on the CITES list.
  - Wst 01: Four credits are targeted for Wst 1: Construction Site Waste Management in BREEAM Data Centres 2010. The aim of this issue is to promote resource efficiency via the effective and appropriate management of construction site waste. As part of this credit, a Site Waste Management Plan has been provided, outlining anticipated waste quantities and actions to minimise waste produced on site. Monitoring of waste should be undertaken to ensure the Circular Economy targets are met. A Pre-Demolition Audit & Pre-Refurbishment Audit have also been undertaken to determine if refurbishment is feasible, and how to maximise recovery of material from demolition. An additional innovation credit is targeted for Wst 1.
- A Construction Waste Management Plan has been provided and should be further developed by the Principal Contractor into a detailed plan.
- Consideration should be given to a higher proportion of recycled content in materials as the design progresses as this would increase the overall recycled content within the building. Updated specifications and cost plans should be provided at each stage to quantify this.
- Maintenance strategies should be provided to ensure the building is being designed with ease of maintenance and longevity in mind.

The following should be updated at **As Built stage**

- Updated Building Circularity score including lessons learned and key achievements
- Updated SWMP demonstrating compliance to waste targets
- Updated Recycling and Waste Metrics Form
- Updated Bill of materials

8.2 Pre-Demolition and Pre-Redevelopment Audit

A Pre-Demolition Audit has been provided by Tilley & Barrett Demolition (November 2024) covering the proposed demolition of the Addison Lee building as a part of the wider Project Union development site. This report can be found in Appendix C. The report also contains demolition plans.

The Condition Survey Report carried out by Savills (December 2024) contains a Pre-Redevelopment Analysis, which explores the refurbishment potential for the existing building. This report can be found in Appendix D.

Table 4: Demolition Waste Quantities by Material

Material	Quantity (tn)	Reused (tn)	Recycled (tn)	Energy recovery (tn)	Landfill (tn)
Concrete	252	252	0	0	0
Bricks	331	0	331	0	0
Tiles and ceramics	1	0	1	0	0
Timber	0.5	0	0	0.5	0
Glass	36	0	36	0	0
Plastics	0.25	0	0.25	0	0
Metals	191.6	86.22	105.38	0	0
Insulation*	4.6	0	4.6	0	0
Gypsum	NA	0	95-100%	0-5%	0
Packaging	NA	0	95%	5%	0
Electrical and electronic equipment	1	0	1	0	0
Floor coverings (soft) / textiles*	4.38	1.752	0	2.628	0
Fluorescent tubes*	0.03	0	0.02955		0.00045
Canteen/office	unknown	0	0	100%	0
Furniture	unknown	TBC			0
Total	**822.36**	**339.972**	**479.25955**	**3.128**	**0.00045**
Percent of Total	**100%**	**41%**	**58%**	**0%**	**0%**

* These material categories have been estimated, and assumptions have been made in the conversion from original quantities available.

Source: Pre-Demolition Audit (Tilley and Barrett, November 2024)

8.3 Excavation and Construction Waste

A Site Waste Management Plan has been developed and is included within Appendix E.

Table 5: Excavation Waste Quantities

Source	Quantity (m3)	End Use
Construction Stage Excavation	2,419.40	Reuse off-site
Cut & Fill Excavation	6975.00	Reuse off-site
Total Quantity	9,394.40	Reuse off-site
Percent of Total	100%	Reuse off-site

Source: Site Waste Management Plan (Sweets Projects Ltd., March 2026) and Cut and Fill Report (HDR, February 2025)

Table 6 Construction waste quantities

Material	Quantity (tn)	Reused (tn)	Recycled (tn)	Energy recovery (tn)	Landfill (tn)
Bricks	49.3	0	49.3	0	0
Concrete	1018.4	0	1018.4	0	0
Aggregates	798.7	798.7	0	0	0
Packaging	30.9	0	27.8	3.1	0
Plasterboard	34.3	0	34.3	0	0
Pipes	100	0	100	0	0
Other (timber)	143.7	0	115	28.7	0
Vinyl	0.4	0	0.4	0.0	0
Office waste	24.9	0	22.4	2.5	0.0
Asphalt	56.6	0	56.6	0	0
Mixed construction waste	512.6	0	512.6	0	0
Metals	53	53	0	0	0
Tiles / Ceramics	1.6	0	1.6	0	0
Adhesives / Sealants	5	0	4.5	0.5	0
Other	106.3	0	95.7	10.6	0
Total	2935.7	851.7	2038.5	45.5	0.0
Percent of Total		29%	69.4%	1.5%	0.00%

Source: Site Waste Management Plan (Sweets Projects Ltd., March 2026)

8.4 Operational waste management plan

A Delivery and Service Waste Management Plan has been developed and is included within Appendix G. This report contains the operational waste estimates.

8.5 Bill of materials

A draft bill of materials is included within Appendix A and is an output of the OneClick software. Data used is a combination of specific quantities and specifications provided by Studio NWA (Architect) and HDR (Structural Consultants) using data extracted from Revit models, and details of building services provided by HDR (MEPH Consultants). Where not available, default figures generated through the One Click software based on the building size have been used. Data was provided as part of the Stage 2 design. Where detailed information is not yet available (for example fittings, furnishings and equipment) an estimation has been made on likely materials.

A breakdown of the data used for the bill of materials table in the CE Statement template to calculate the material intensity is also included. This covers at least 95% of the materials.

8.6 End of life strategy

In line with circular economy principles, the proposed design intends to extend the lifetime of the proposed development through careful design and specification, and enable flexibility, adaptability, and recyclability, based on the measures listed in the previous sections. The end-of-life strategy scenarios for the proposed development are outlined in Appendix B, have also been captured in the Whole Life Carbon Assessment (WLCA), which has been produced for the development and has been submitted as a stand-alone document.

The building's modular design allows for ease of removal and disassembly. The facility can be deconstructed and relocated to a new site.

Design documents along with material specification and manufactures data sheets used in the development will be stored and updated as and when additional works are undertaken. This information can be used towards the end of life to inform the end-of life strategy, disassembly, future reuse, waste avoidance, waste reduction. It is currently expected that this data will be provided through the provision of a Building Information Model, alongside detailed drawings and specifications.

The following strategies will be carried out for associated materials, where feasible:

- Reinforced concrete is the most predominant material proposed within the building with 48,402,021.43 kg expected. Reinforced concrete can be broken up into the component parts of reinforcement and concrete for reuse.
- Steelwork can be disassembled for reuse or recycling.

- Pre-fabricated data hall construction has the potential to be deconstructed and reused on a new site.
- All cladding elements are designed to be dismantled with potential reuse on other constructions.
- MEP Products will be reused or recycled where possible. Centralised service risers and plant on parts of the roof allow access for maintenance as well as removal for reuse, refurbishment, or recycling.
- Fixtures, fittings, and furniture should be removed for reuse, recycling, or to be given away / sold to a charity / local market.

A manual will be developed during detailed design that explains how the building should be eventually de-constructed, allowing for removal and the above strategies to be carried out.

The end-of-life circular handling of materials (materials returned) is summarised below in Table 7 and shows that the majority of materials will be downcycled (recycled, but with value loss, such as reuse of concrete as aggregate). This is due to the high levels of concrete. Only 1.08 % is expected to be disposed of in landfill. The reuse potential of the steel superstructure and building cladding results in 9.06% of the building materials reused at the end of life.

The project envisaged end of life is not for 60 years, at which point material reuse and recycling technologies are expected to be more advanced than today.

Result category	Reuse as material	Recycling	Downcycling	Use as energy	Disposal	Total
	kg	kg	kg	kg	kg	kg
Construction Materials	5,817,175.90	6,108,989.96	49,523,165.46	324,034.54	125,870.55	61,899,236.41
Earth masses, asphalt and stones	557,185				458,080	1,015,265.00
Construction site - material wastage	30,080.33	275,523.26	2,051,606.99	26,031.13	6,853.72	2,390,095.43
Material replacement and refurbishment		3,529,300	1,062,390	620,560.93	170,857.72	5,383,108.65
Total	6,404,441.23	9,913,813.22	52,637,162.45	970,626.60	761,661.99	**70,687,705.49**
%	9.06	14.02	74.46	1.37	1.08	

Table 7 End of Life results

8.7 Whole Life Carbon Assessment

There is a close relationship between this guidance and the Whole Life Carbon guidance.

A Whole Life Cycle Assessment (WLCA) in accordance with the GLA requirements has been undertaken for the proposed redevelopment at Union Park Block 4, Bulls Bridge Industrial Estate (HDR, February 2025). This has been done with the aim of recognising and encouraging measures to optimise construction product consumption efficiency, and the selection of products with a low environmental impact (including embodied carbon) over the life cycle of the building.

The WLCA has been run for the new building in line with the GLA requirements. This has been based on materials data provided by the project design team for applicable building elements required by the GLA methodology where gaps where found, the OneClick database was used.

9 Conclusion

This report demonstrates how Circular Economy principles have been embedded in the design strategy for the Development from the early stages of the design, aiming to maximise opportunities for design for longevity, adaptability and flexibility, in line with Policy SI 7 of the London Plan and following the GLA's Guidance on Circular Economy Statements.

The calculated Building Circularity score represents the total materials circularity both in use of materials for the project as well as end of life handling. It is calculated as the average of Materials Recovered (representing use of circular materials in the project) and Materials Returned (representing how effectively materials are returned, instead of disposed of or downgraded in value. The calculation is purely mass based without material weighing.

The overall Building Circularity score, as calculated by OneClick is 38%.

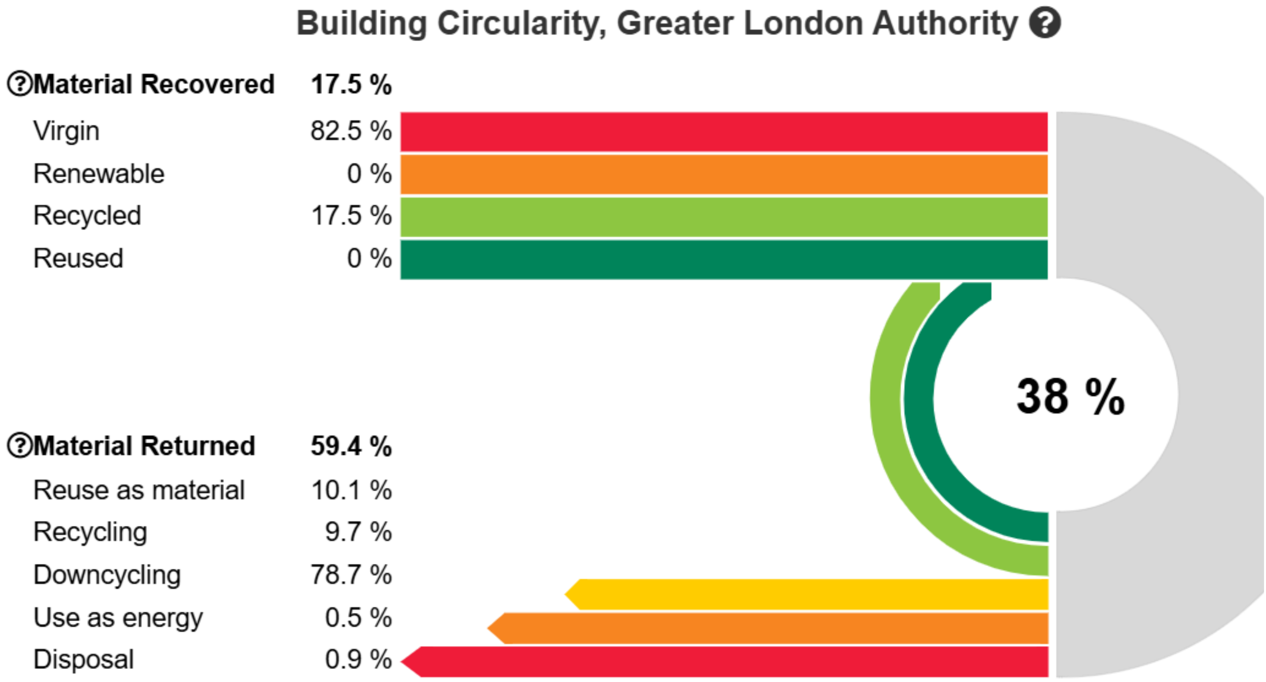

Figure 10 Building Circularity score

Figure 12 shows the key material groups and their percentages of recovery, recycled, and returned, therefore giving the percentage of circularity for each category. The percentage of circularity can be increased through specification of products with high levels of recycled materials, which are readily recyclable. The recyclability and overall environmental impact of a chosen material is most accurately assessed using product level EPD's. The percentage of circularity can be tested through the procurement process as more detail surrounding the final products includes EPD's are known.

Building Circularity - Key Material Groups Download Results Summary

Result category	Total kg	Virgin %	Materials Recovered %	Disposal %	Downcycling and use as energy %	Recycling and reuse as material %	Materials returned %	Circularity %
Concrete	48,402,021.43	86.58	13.42		100		50	31.71
Metal	10,173,098.02	57.51	42.49			100	100	71.24
Bricks and ceramics	58,754.02	100	0		100		50	25
Gypsum-based	1,133,505.76	98.43	1.57		93.73	6.27	53.14	27.35
Insulation	12,423.12	43.78	56.22	88.77	11.23		5.61	30.92
Glass	78,109.5	97	3			100	100	51.5
Wood and biogenic								
Earth masses and asphalt	1,015,265	89.02	10.98	45.12		54.88	54.88	32.93
Other materials	2,041,324.54	98.19	1.81	5.63	15.81	78.57	86.47	44.14

Figure 11 Building Circularity - key material groups

The circular economy aspirations of the proposed development are also aligned with the Whole Life Carbon Assessment produced for the proposed development, which is submitted as a stand-alone document.

Appendix A. Bill of Materials

Appendix A: Summary Bill of Materials: Source of information: OneClick LCA

Section	Result category	Material quantity kg	Material intensity kg/m² Gross Internal Area	Estimated reusable materials kg/m²	Estimated recyclable materials kg/m²	Data source
1	1 Substructure	44,084,265	1,307.09		1,307.09	Information provided by the project team, extract from Revit models.
21	2.1 Superstructure: Frame	1408702	41.77	19.75	22.02	Information provided by the project team, extract from Revit models.
2.2	2.2 Superstructure: Upper Floors	5254611	155.8		155.44	Information provided by the project team, extract from Revit models.
2.3	2.3 Superstructure: Roof	1944107	57.64		42.58	Information provided by the project team, extract from Revit models.
2.4	2.4 Superstructure: Stairs and Ramps	49520.75	1.47		1.47	Information provided by the project team, quantities calculated through OneClick Carbon Designer software.
2.5	2.5 Superstructure: External Walls	801,164	23.75	3.74	20.01	Information provided by the project team, extract from Revit models.
2.6	2.6 Superstructure: Windows and External doors	10,119,81	0.3		0.3	Information provided by the project team, extract from Revit models.
2.7	2.7 Superstructure: Internal Walls and Partitions	1,053,687	31.24		31,.18	Information provided by the project team, extract from Revit models.
2.8	2.8 Superstructure: Internal doors	51,025.65	1.51		1.47	Information provided by the project team, extract from Revit models.
3	3 Finishes	1370958	40.65		38.18	Information provided by the project team, extract from Revit models.
4	4 Fittings, furnishings & equipment	762.79	0.02		0.00	Information provided by the project team.
5	5 Services (MEP)	1800350	53.38		44.83	Plant Schedule
6	6 Prefabricated buildings and building units	5,055,000	149.88	149.88		Information provided by the project team, extract from Revit models.
7	7 Work to existing building					
8	8 External works	2,445,340	72.5	16.52	54	Information provided by the project team, Bill of Quantities,
0	0 Unclassified / Other					
	Total	65,329,613,84	1,937.01	189,89	1,718.48	

Appendix B. End of Life Strategy

Materials	Total kg	End of life strategy	Disposal %	Downcycling and use as energy %	Recycling and reuse as material %
Concrete	48,402,021.43	Concrete crushed to aggregate		100	
Metals	10,173,098.02	Metal recycling / Reuse of steel sections & prefabricated units			100
Bricks & ceramics	58,754.02	Crushed to aggregate		100	
Gypsum-based	1,133,505.76	Gypsum recycling / Cement/mortar used as backfill		93.73	6.27
Insulation	12,423.12	Landfill, small amount downcycled	88.77	11.23	
Glass	78,109.5	Glass recycling			100
Wood and biogenic		Incineration			
Earth masses and asphalt	1,015,265	Reuse (via reprocessing), disposal	45.12		54.88
Other materials	2,041,324.54	Landfill / incineration/ recycling	5.63	15.81	78.57

Building Circulariy – Materials returned

Result category	Reuse as material	Recycling	Downcycling	Use as energy	Disposal	Total
	kg	kg	kg	kg	kg	kg
Construction Materials	5,817,175.90	6,108,989.96	49,523,165.46	324,034.54	125,870.55	61,899,236.41
Earth masses, asphalt and stones	557,185				458,080	1,015,265.00
Construction site - material wastage	30,080.33	275,523.26	2,051,606.99	26,031.13	6,853.72	2,390,095.43
Material replacement and refurbishment		3,529,300	1,062,390	620,560.93	170,857.72	5,383,108.65
Total	6,404,441.23	9,913,813.22	52,637,162.45	970,626.60	761,661.99	**70,687,705.49**
%	**9.06**	**14.02**	**74.46**	**1.37**	**1.08**	

Appendix C: Pre-Demolition Audit

Appendix D: Condition Survey Report

Appendix E: Site Waste Management Strategy

Appendix F: Circular Economy / Whole Life Carbon workshops

Appendix G: Delivery & Service Management Plan

Appendix H: Recycled Content Calculations

Element	Component	Quantity	Material rate		Material Value (£)	Recycled content by mass or volume %	Recycled content by value
SUB-STRUCTURE	Concrete piles	7,000m^3	£809.00	per m3	£5,663,000	14	£792,820
	Concrete foundation slab	6,500 m^3	£277.00	per m3	£1,800,500	14	£252,070
	Concrete cable chamber	200 m^3	£283.00	per m3	£56,600	14	£7,924
	Concrete ground floor slab	3,000 m^3	£235.00	per m3	£705,000	14	£98,700
	Reinforcement	2,318,000 kg	£1.74	per kg	£4,033,320	97	£1,3,912,320
FRAME	Structural steel (admin and energy centre)	1,363 t	£3,090.00	per tonne	£4,212,443	20	£842,489
FLOORS	Concrete	599 m^3	£239.00	per m3	£143,082	14	£20,031
	Reinforcement	29,934 kg	£1.93	per kg	£57,772	97	£56,039
	Composite floors	12,112 m^2	£63.38	per m2	£767,659	15	£115,149
ROOF	Roof coverings	3,985 m^2	£212.00	per m2	£844,820	tbc	£0
	Concrete roof	170 m^3	£239.00	per m3	£40,534	14	£5,675
	Reinforcement	8,480 kg	£1.93	per kg	£16,366	97	£15,875
	Composite roof	3,008 m^2	£63.38	m2	£190,647	15	£28,597
	Green roof	3,985 m^2	£97.35	m2	£387,940	tbc	£0
	Cement paving slabs	861 m^2	£187.00	m2	£161,007	0	£0
STAIRS	Precast concrete stairs	1 unit	£65,415.00	no	£65,415	3	£1,962
	steel stairs	1 unit	£4,604.00	no	£4,604	0	£0
EXTERNAL WALLS	Sandwich panels	10,195 m^2	£523.00	per m2	£5,331,985	0	£0
	Bricks	386 m^2	£162.00	per m2	£62,532	0	£0
	metal cladding	6,783 m^2	£440.00	per m2	£2,984,520	30	£895,356
	Metal louvres	148 m^2	£227.00	per m2	£33,596	30	£10,079
	curtain walling	1,224 m^2	£912.00	per m2	£1,116,288	3	£33,489
WINDOWS & EXT DOORS	doors	14,810 kg			£182,627	tbc	£0
INTERNAL WALLS	Plasterboard	6,762 m^2	£27.00	per m2 (average)	£182,574	25	£45,644
	Internal sandwich panel walls	17,053 m^2	£223.00	per m2	£3,802,819	12.7	£482,958
	precast concrete walls	836 m^2	£114.00	per m2	£95,304	3	£2,859
INTERNAL DOORS	Internal doors	72,359 kg			£1,057,704	tbc	£0
FINISHES	vinyl	10,476 m^2	£54.00	m2	£565,704	25	£141,426
	Screed	506 m^2	£280.00	m2	£141,652	0	£0
	Suspended ceiling data halls	6,490 m^2	£339.00	m2	£2,200,110	26	£572,029
	ceiling tiles	1,201 m^2	£84.00	m2	£100,884	22	£22,194
PRE-FABRICATED BUILDINGS	Structural steel (data halls)	5,055 t	£3,090.00	per tonne	£15,619,950	30	£4,685,985
EXTERNAL WORKS	Roads, paths, paving's	2,134,450.75 kg	-	kg	£220,276	7.3	£16,080
	Drainage	73,405 kg	-	kg	£252,319	tbc	£0
	External works	174,676 kg	-	kg	£386,159	5	£19,308
				total	**£109,145,177**	**11.99%**	**13,083,180**

Appendix I: Cut and Fill Report