Detailed Circular Economy Statement

Vinegar Yard

Southwark

Contents

Rev	Date	Reason for Issue	Prepared		Reviewed		Approved	
01	21.10.2021	Planning submission	RC	21.10.2021	AR	21.10.2021	KA	21.10.2021

1 Executive Summary

This Circular Economy Statement outlines the strategic approach and circular economy principles applied to Vinegar Yard ("Proposed Development"), a commercial scheme comprising office and associated clinical areas.

This report aims to show how sustainability and circular design principles have been incorporated since the outset of the project and that the Proposed Development sets very high aspirations on sustainability and circularity.

The key commitments and targets respond to support the policies of the Southwark Council, policies D3 and SI7 of the London Plan are to:

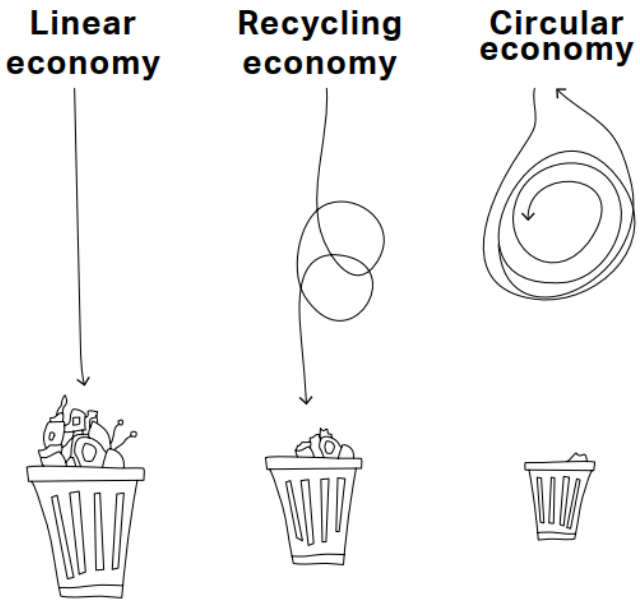
- A landmark development to demonstrate tangible sustainability measures to include health and wellbeing for the occupants, energy solutions and water saving features;
- Aspire to be a low carbon building for both operation and embodied carbon for construction;
- Exceed targets of carbon emission savings, reducing water consumption and use of virgin materials, wherever possible;
- Maximise the use of reused, upcycled or recycled materials;
- Aspire to close the loop of waste generation during construction by specifying recycled content and reused materials, and upcycling materials wherever possible and working with the supply chain for improved efficiencies;
- Set out a Sustainable Procurement Plan and challenging supply chain to source and deliver lower carbon materials to the site;
- Aim for a 95% diversion of construction and demolition waste from landfill (non-hazardous);
- Rationalise the grid structure to promote pre-fabrication and modularization;
- Optimise material use and use whole life-cycle carbon analysis for assisting decision-making process;
- Design for ease of disassembly from concept design;
- Develop a site waste management strategy during building's In-Use phase;
- Achieve 65% recycling rate for municipal waste, and allocating storage spaces for collection of waste and;
- Implement a waste collection strategy for the development to maximise recycling.

2 Introduction

2.1 Linear vs Circular

The linear economy is the current 'traditional' model based on the 'take-make-consume-waste' approach which is used to today. Raw materials are transformed into a product and is wasted at its end of life. Similarly, the process of downcycling produces materials of a lower quality and functionality than the original material. However, this method does keep the materials in use and out of landfill. The idea of upcycling reuses waste without destroying it in order to form a new product.

In a circular economy, manufacturers design products to be reusable and the end of the building's life. To gain a holistic approach to this issue, circular economy should be viewed as a business strategy and not just a single aspect of sustainability. The UKGBC Circular Economy Report (2019) highlights the business opportunities that a circular economy can bring. These include the generation of a reliable lower-risk cash flow, create long lasting client relationships and to de-risk project pipelines.



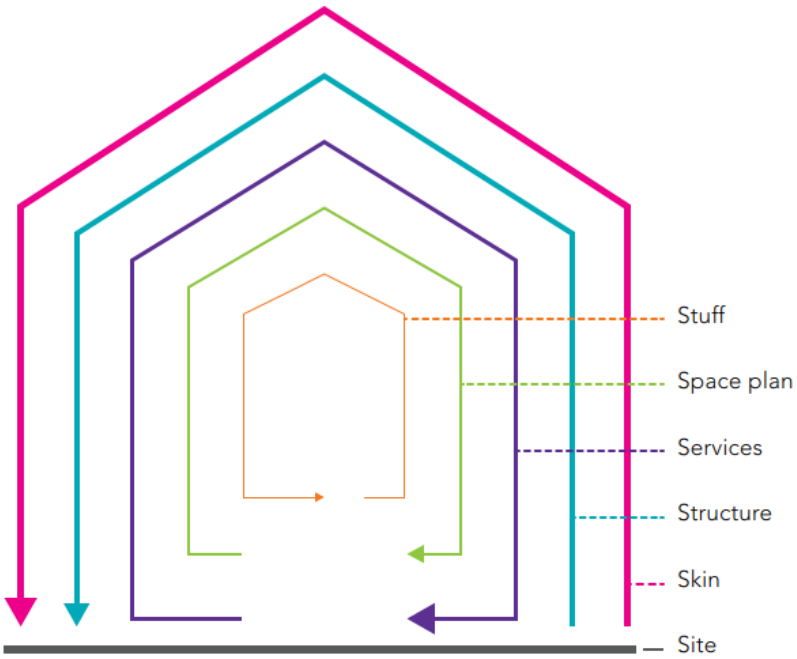
FROM TAKE • MAKE • USE • DISCARD TO RE-MAKE • USE-AGAIN

Diagram courtesy of Circular Flanders

GLA Circular Economy Statement (2020)

The integration of reusable materials introduces the concept of urban mining and material passports which allows the building to have value during the end of life and deconstruction period. The aim of material passports is to document the materials present in a building to maximise reuse at the end of life. Material passports act as a database for new developments to encourage material reuse to reduce their environmental impact. These passports cover everything from the foundations of a building to the front façade, window frames, inner walls to the roof structure. This aligns with the below breakdown from Skin to stuff.

The process of logging suitable materials for reuse will facilitate urban mining: treating a city like a mine where valuable materials exist and can be extracted.

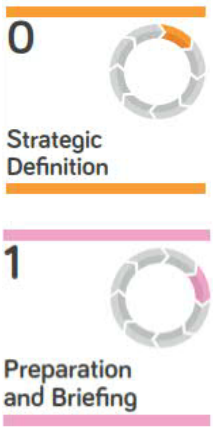


UKGBC Circular Economy Guidance (2019)

It is important to breakdown the elements of a building as highlighted above, so that realistic lifetimes for each can be determined. We often set the lifetime of building assets to 60 years however some last longer or less. During the early design process, it is therefore crucial to consider realistic lifetimes and where possible involve the building end user.

2.2 Project Stages

Early stage engagement is the key to a successful circular economy approach to add value across the entire building's life. The RIBA 2020 Plan of Works sets out key stages, outcomes, core tasks and information required at each stage. By using these defined stages, we have set out a clear approach to integrate circular economy principles in the proposed development.



Stage 0-1

- Set initial objectives for the circular economy aspirations
- Assess the current site and identify opportunities by undertaking a pre-demolition/ pre refurbishment audit
- Develop objectives with measurable targets
- Identify any additional appointments
- Develop the **Draft Circular Economy Statement**

Stage 2-3

- Conduct a workshop to investigate the circular economy approach (including suppliers, contractors, design team)
- Agree opportunities, commitments, and metrics
- Develop the **Detailed Circular Economy Statement**

Stage 4

- Include targets and metrics as clauses within the procurement documentation
- Engage with suppliers

Stage 5

- Monitor the metrics with the contractor and supply chain
- Investigate alternative materials and products where relevant

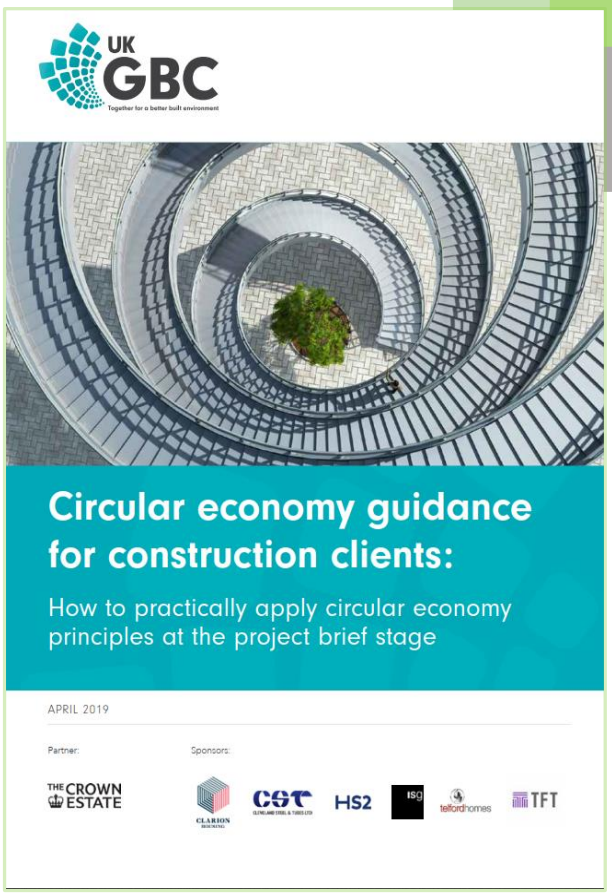
Stage 6-7

- Review success against the objective
- Complete a lessons learned
- Provide the **Final Circular Economy Statement**

3 Key Guidance

3.1 UKGBC Circular Economy Guidance for Construction Clients

The UK Green Building Council released the circular economy guidance for construction clients in April 2019 on how to practically apply circular economy principles at the project brief stage. This document provides a clear framework for delivering the core circular economy principles at each stage of a project and has been adopted to inform this statement.



The UKGBC outline three principles to underpin the transition towards renewable energy sources:

- Design out waste and pollution
- Keep products and material in use
- Regenerate natural systems.

To achieve the above goals, a selection hierarchy has been outlined which can be applied when selecting and designing components. It is important that the supply chain remains transparent and that early engagement takes place.

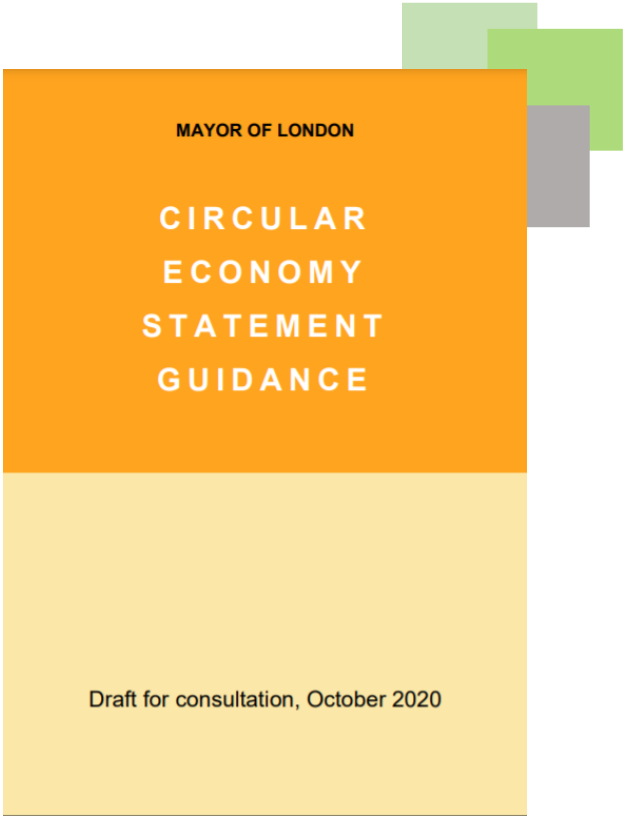
Design out	▪ Design out the need for the component or material (e.g. passive design)
Reclaimed, remanufactured components	▪ Use reclaimed materials over new ▪ Use remanufactured components over new
Product selection	▪ Use products with labels such as Cradle to Cradle (C2C) and Natureplus ▪ Select products that can be remanufactured or reused at end of first life ▪ Use materials with recycled content ▪ Select products that are design for disassembly ▪ Select materials that can be recycled or composted at end of life ▪ Consider leasing short-lived components.

3.2 GLA Circular Economy Statement Guidance

The recent adoption of the published London Plan (March 2021) 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.*



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.

Principle	**Develop commitments to…**
Conserve resources, increase efficiency and source sustainably	▪ Minimise the quantities of materials used ▪ Minimise the quantities of other resources used ▪ Specify and source materials and other resources responsibly and sustainably
Design to eliminate waste	▪ Design for longevity, adaptability or flexibility and reusability or recoverability ▪ Design out construction, demolition, excavation, and municipal waste arising
Manage waste sustainably and at the highest value	▪ Manage demolition waste ▪ Manage excavation waste ▪ Manage construction waste ▪ Manage municipal waste

3.3 Circularity and BREEAM

The current version of BREEAM used for new build non-domestic projects in the UK was released March 2018. BREEAM rewards a wide range of practical solutions, that incorporate circularity principles for design decision-making and the procurement of products and services.

By interpreting the sustainability guidance set out in each the environmental sections, a project can prevent a tick boxing exercise and apply tangible sustainable solutions to each development.

The BRE released the Circularity and BREEAM guidance in 2021 to demonstrate how the circular economy principles tie in with the BREEAM assessment methodology.

BREEAM sees the application of the core circularity principles relating to resource use and supply chains offering the greatest opportunity to enhance and better communicate related requirements in our asset sustainability assessment approaches. Specifically, as part of a wider asset sustainability assessment, BREEAM sees circularity becoming more prominent through both of the following complementary approaches:

- Practical solutions: Following practical, specific circularity principles for design practice and the procurement of products and services;
- Holistic performance assessment: Demonstrating quantified holistic performance using life cycle assessment, energy modelling, life cycle costing and water modelling.

Holistic performance assessment complements practical solutions by measuring and reporting quantified performance against established indicators with physical units, covering a range of environmental issues including climate change, water scarcity, toxicity and resource depletion.

Practical solutions complement holistic performance assessment, which does not provide solutions or guidance to improve performance, by providing a range of tangible and specific measures likely to improve performance.

There are criteria within BREEAM that have a direct impact on the circularity of a building. These are outlined below:

- Wst 01: Pre-demolition audit
- Wst 05: Adaptation to climate change
- Wst 06: Designing for disassembly
- Mat 01: Life Cycle analysis
- Mat 03: Sustainable procurement plan
- Man 02: Life Cycle Costing

The criteria are not limited to these therefore BREEAM should be used as a holistic approach to circularity.

4 The Development

30,503m^2

Office

Medical

BREEAM ‘Excellent’

Stage 2

The proposed Vinegar Yard development is a mixed-use development, which is bounded, by St Thomas Street, Fenning Street, Vinegar Yard and Snowfields including Nos. 1-7 Fenning Street and No.9 Fenning Street, SE1 3QR. The site is located in London Bridge area in the London Borough of Southwark. This is a mixed-use development to provide a flagship Vinegar Yard for St Thomas Bermondsey Limited at the junction of St. Thomas Street and Fenning Street.

Redevelopment of the site to include the demolition of existing buildings, retention and refurbishment of the warehouse and the erection of a ground, mezzanine and 18 storey building (with plant at roof level and 3 basement levels) comprising of café and community space within the warehouse and flexible retail, affordable workspace and flexible office and medical/research floorspace within the new building, cycle and disabled car parking, servicing, refuse and plant areas, public garden (including soft and hard landscaping), highway improvements and all other associated works.

The updated scheme seeks to provide flexible medical and research & development floorspace (Use Classes D1 or B1(b)) designed to allow for occupation by Guys and St Thomas’ NHS Foundation Trust, but flexible to ensure long term resilience. Levels one to ten of the building will first be offered to Guys and St Thomas’ for use as either D1 medical space or B1(b) research & development. The remainder of the upper floors, levels 11 to 18, comprise a B1(a) office use. This configuration reflects Guys and St Thomas’s Adaptable Estates Strategy, where buildings are able to accommodate a range of possible functions both physically and by virtue of permitted uses in the long term.

Table below outlines the breakdown of spaces for the proposed Vinegar Yard development.

Table: Area schedule by planning use based on two options:

Medical Use Scenario – Use Class D1	**GIA, m²**
Class B1(b) - Medical use – Levels 11 to 18	**8,207**
Class D1 - Medical Use – Outpatients – Levels 1 to 10	**12,314**
Class D1 – Affordable Workspace Mezzanine D1/B1(b)	**1,835**
Ground Medical (circulation): Use class	**320**
Ground Affordable Workspace (circulation): Flexible use class D1 / B1(b) floorspace	**117**
Ground Retail: Flexible use classes A1, A2, A3 & A4 floorspace	**408**
Basement Affordable Workspace: Use class B1 floorspace	**1,115**
Plant – Building Service Systems (Mechanical)	**5,827**
Warehouse: First floor Community: Use class D1 floorspace	**180**
Warehouse: Flexible use classes A1, A2, A3 & A4 floorspace	**180**
Total Above Ground	**24,952**
Total Below Ground	**5,551**
TOTAL	**30,**503

Research & Development – Use Class B1(b)	**GIA, m²**
Class B1(b) - Medical use – Levels 11 to 18	**8,207**
Class B1(b) - Medical Use – Outpatients – Levels 1 to 10	**12,644**
Class D1/ B1(b) – Affordable Workspace Mezzanine	**1,835**
Ground Research & Development (circulation): Use class B1(b)	**320**
Ground Affordable Workspace (circulation): Flexible use class D1 / B1(b) floorspace	**117**
Ground Retail: Flexible use classes A1, A2, A3 & A4 floorspace	**438**
Basement Affordable Workspace: Use class B1 floorspace	**1,115**
Plant – Building Service Systems (Mechanical)	**5,467**
Warehouse: First floor Community: Use class D1 floorspace	**180**
Warehouse: Flexible use classes A1, A2, A3 & A4 floorspace	**180**
Total Above Ground	**24,952**
Total Below Ground	**5,551**
TOTAL	**30,**503

4.1 Methodology

In order to ensure that a Circular Economy Strategy is in place during the early design stages of the development, a multi-disciplinary workshop was undertaken on 11th October 2021. This included the project Architect, Engineering, Structural Engineers and the Cost Consultants. The aim of this workshop was to begin a discussion surrounding the circular and design for disassembly principles. This are outlined in the Strategic Approach and the Key Commitments for the development.

Further workshops will be held to incorporate the disassembly principles into the design and discuss the opportunities for high recycled content materials where feasible at Stage 3 of the design and Stage 4 where tender procurement will take place.

4.2 Aspirations

The Proposed Development has taken circularity into consideration from Stage 2 Concept Design. As the design progresses, so will the different disassembly principles. The development aspires to achieve at least 20% of recycled content of the overall materials procured. Responsible Sourcing Certification Schemes will also be sought out such as BES 6001 and ISO 14001. The Proposed Development will achieve a minimum BREEAM rating of 'Excellent' with strong aspirations for 'Outstanding'. The development's aspirations are expanded on under Section 5 onwards where the circular economy principles are discussed and the links circularity has to BREEAM.

5 Circularity Strategic Approach

The strategic approach for the development is followed by using a number of scenarios based on whether the clients is refurbishing or developing a new building. These options are discussed in Section 5.1.

The initial steps towards a circular building are to take into account the holistic sustainability methods applied to the development. The below targets are in accordance with the project's overarching strategy and BREEAM targets. The following documents have been used to inform this statement:

- Design and Access statement
- Whole Life-Cycle Carbon Assessment
- Sustainability Assessment Method Reports
- Pre-Demolition Study.

BREEAM Targets

Water - 40% reduction

Energy – <50% annual carbon reduction

LCA - ≤800kgCO_2e/m^2 GIA

Ecology – UGF 0.301

Water

The Proposed Development has set strong aspirational project targets for potable water consumption. The development will seek to achieve this in a number of ways, through integrating low consumption thinking into the earliest stages of project design, focusing on water recycling, providing crossover with our urban greening aspirations and looking at water management holistically.

The low-consumption culture begins with the intent to specify water-consuming components and sanitaryware with a high standard of water efficiency. Components will be selected in accordance with the EU Water Efficiency Label, targeting the top two 'green' bands of this label to provide performance verification and support the project approach. In addition, sanitaryware will have set performance requirements to help facilitate the first stage of water-use reduction from end users. This is based primarily on the performance criteria set out in BS 8542:2011 Table 8.6, which sets out the sanitary components water efficiency criteria and water recycling contributions to achieve certain levels of water efficiency. The project is proposing to target the most onerous of these bands, 'Outstanding', to support the low-consumption approach. The credit performance bands in BREEAM Wat 01 also help to underwrite this approach. The minimum standard for BREEAM Excellent in Wat 01 is 1 no. credit, and for 'Outstanding' the minimum Wat 01 credit score is 2 no. credits.

The Proposed Development will target a minimum of 3 no. Wat01 credits and go beyond this to seek to achieve further credits, which will be supported by the WUI target approach. This is also in exceedance of the requirements of the London Plan Policy SI 5 item C (2).

Referring to the BREEAM assessment, engagement and target of credits such Wat 02, Wat 03 and Wat 04 also assist in supporting the development water strategy and answering the requirements of the London Plan Policy SI 5 item C (3). Sufficient water metering will be provided within the development, covering both the incoming supply and also monitoring water usage of high-consumption systems and building areas. A water leak detection system will be provided, which will monitor leaks throughout the development and synchronise with the BMS to ensure that leaks are identified and can be mitigated quickly. In addition, sanitary supply shut off devices, such as PIR linked to the lighting systems, will be included to only supply water to spaces (such as WCs and hand basin taps) when it is required. All of these solutions support the low flow sanitaryware specification requirements and water recycling approach.

Energy

The heating and cooling strategy for the Proposed Development will primarily be achieved through reversible air sourced heat pumps (ASHP) located on the roof. The primary function of the heat-pumps will be to move heat around within the building as required during simultaneous heating and cooling operation and to inject heat from thermal storage when there is a deficit or to reject heat to outside when there is a surplus (cannot be stored).

The office buildings have enough thermal energy flows generated by human activity to provide the base for both heating and cooling of the entire site. By connecting buildings spaces with different needs and balancing the energy between them, effectively using all available energy flows makes it possible to decrease both pollution and the energy consumption on the proposed site.

During simultaneous heating and cooling operation, heat will be taken from spaces which require cooling and conveyed via a water loop to the ASHP. At the heat pumps, this heat will be upgraded and conveyed via a low temperature hot water loop to the spaces which require heating.

The ventilation strategy for the office spaces will primarily be achieved through floor by floor (floor void) mounted mechanical ventilation with heat recovery (MVHR) units distributed across the floor spaces. These units will interface with louvres in the external façade to convey air from outside into the building's internal occupied spaces while simultaneously exhausting a similar amount of indoor air. It is estimated that 20-40% of cooling energy can be saved through the use of free cooler outside air to ventilate the spaces during mid-season and night-time.

Heat exchangers within these units will transfer a large portion of the heat contained within the indoor air to the outdoor air being supplied which will mitigate excessive heat loss within the winter.

Materials

Whole Life Cycle carbon emissions are those associated with the construction, use and eventual deconstruction of a development over its whole life cycle, considering impacts of construction materials, along with their repair, maintenance and replacements, as well as regulated and unregulated operational carbon emissions. The process follows the method set out in EN 15978:2011, which is the European methodology for life cycle assessment.

In determining a target that the development team deemed both achievable for the wider strategy and onerous enough to support the strong sustainability goals, all of the benchmark bands were considered. It was agreed that the '2025' benchmark, with an embodied carbon intensity target of ≤800-900 $kgCO_2e/m^2$ GIA was the correct aspirational target to set for the project. This reflects an embodied carbon reduction of ~25-35% when compared to the 'current benchmark' of RIBA 2030.

To report against the RIBA 2030 Climate Challenge, and in order to fulfil the aspiration of completing the most robust WLC assessment possible at this time, the methodology set out in the *RICS Professional Statement – Whole Life Carbon assessments for the build environment (2017)* has been followed. The RICS method aligns closely with the modular structure of EN 15978:2011, and provides set rules for calculations and data provisions, as well as element scope (as per RICS NRM 1) and sequential modelling requirements. The initial model should provide a baseline and a set of reduction measures either under consideration or implemented to work towards the achievement of project targets. The RICS document also provides sets of assumptions and base scenarios for material specifications, transport distances and replacement cycles, where these are not readily available due to the staging of the modelling works. Along with the RIBA 2030 Climate Challenge, the UKGBC, LETI and GLA requirements all call for use of the RICS method when providing reporting against WLC goals.

As previously noted, BREEAM 2018 also now has a section which deals with embodied carbon in a greater level of detail compared to previous schemes. The old BRE Green Guide to Specification is now defunct, replaced with a more robust LCA methodology using approved software, therefore making Southwark Sustainable Design & Construction SPD (2009) Section 11.5 reference to the Green Guide no longer fit for purpose. The Mat01 credit section can be viewed as a 'RICS Lite' approach, in that the scope of

element/material inclusion is lower, and BREEAM has fewer sequential modelling steps compared to the full RICS approach. Sweco work has also demonstrated that a BREEAM-led method only accounted for ~60% of the total whole life embodied impact of a development, and therefore this is not the most complete and robust method of WLC assessment.

Ecology

Enhancing site biodiversity and facilitating urban greening is one of the six core development strategies for the Proposed Development. The development team have acknowledged that focus on this area has wider benefits to the scheme beyond simply providing better habitats for wildlife, and also enhances the strategies related to surface water management, occupant health and wellbeing, and potentially helping to tackle an aspect of the Urban Heat Island (UHI) phenomenon.

A Preliminary Ecological Appraisals has been carried out by Wardell Armstrong and accompanies this planning application. An initial site survey confirmed that the site is of low ecological value with little vegetation and no trees to be protected.

The Preliminary Survey makes a number of provisional recommendations for enhancing the ecological value of the site, which could be summarized as below:

- At least 10 integrated 'woodcrete' swift boxes will be installed under the eaves of the multi-storey building. As swifts, typically nest in the upper elevations of tall buildings. A suitably qualified ecologist will specify the exact locations and designs prior to the finalisation of detailed design. These will not need to be accessible and will be left undisturbed once installed.
- In addition, at least 10 'woodcrete' house sparrow terraces will be installed, where possible, under the of the two-storey building to provide suitable nesting opportunities for the species. As for swift, house sparrow populations have declined considerably in recent years and as lack of available nesting opportunities may be a contributing factor, such enhancements are considered worthy, especially for species which are associated with urban environments.

Other enhancements:

Enhancement of vegetation on the development could include the planting of small native tree species such as birch Betula sp., oak Quercus sp., wild service Sorbus torminalis as well as wild cherry Prunus avium. These species are fruit-bearing and flowering species, providing a suitable food source for foraging birds and invertebrates.

- The planters should also include herbaceous species, selected ideally from native stock and/or from species, which are known to provide nectar resources to bees, butterflies and other insects.
- In addition, small log piles could be provided, where possible, within the vegetation as habitat for invertebrates such as the stag beetle.
- Installation of sensitive lighting on the development could be used to avoid deterring any wildlife such as bats.

As shown from the list above, opportunities will be explored through the design process to enhance the plot for wildlife and landscaped spaces in this highly urbanised environment and most suitable measures / recommendations will be integrated.

The goal will be the best optimization of the landscape design uses native planting, where possible, to provide high-quality landscaping and to promote nature conservation by attracting local wildlife. The new landscaping aims to enhance the area for wildlife by providing new habitats and foraging areas in this urbanised location.

The BREEAM 2018 scheme also has a new ecology framework, which better supports positive ecological outcomes compared to previous schemes. The appointed SQE is now more involved at Stage 2 of design, allowing better consultation with the wider design team for more appropriate and timely integration of ecological enhancements, enabling determination of recommendations that are suitable in the development context and support overall aims. Given the pre-development site condition for the existing building, and the level of planting proposed for by this application, the Proposed Development is targeting 100% of the available credits from LE 02-LE 05 in BREEAM 2018, which underlines our demonstration of intent.

Aspect	Aim	Approach	Explanation	Target
Existing development and components				
Circular Economy approach for the existing site	Refurbishment	Redevelop for similar needs and uses Meeting or exceeding current regulations and standards through restoring, refinishing and future proofing Minimise changes and avoid replacement of parts Design for longevity, adaptability or flexibility	The existing warehouse located to the south west of the site in being retained and refurbished. The aim is to retain and restore as much of the existing structure fabric as possible.	
	Repurpose	Redevelop to accommodate different needs or uses Meeting or exceeding current regulations and standards with changes and replacement of shorter-life parts Design for longevity, adaptability or flexibility	Existing warehouse to be redeveloped to accommodate a community-focused use with ground floor retail and first floor flexible meeting/event/exhibition space	
	Deconstruct and reuse	Disassembled and reconstructed elsewhere Individual components directly reused elsewhere		
	Demolish and recycle	Traditional demolition Elements and materials converted into new elements for use on site or nearby	Demolition of the existing structure to be minimised where possible with the existing fabric to be reused or recycled where possible.	95% diverted fron landfill

Long life new developments or components				
Circular economy approach for the new building	Longevity	Tailored to well-defined, long term needs Designed to be durable and resilient To adapt to change with little modification or replacement of parts Internal space can be easily adapted to alternative technologies, different ways of living or working	Mixed mode ventilation proposals for the office floor plate enabling areas to be naturally ventilated during favourable external conditions. Mixed mode ventilation therefore has the potential to improve lifespan of the mechanical systems due to fewer hours of operation, subject to external conditions. Building designed for a design life of 60 years. Structural grid developed to suit a flexible planning grid. Attenuation (blue roofs / tanks) designed for 1-in-100-year plus climate change event.	No more than 7.5m3 of construction waste per 100m2 (GIA) 800-900 kgCO2/m2 GIA
	Adaptability	Design to meet the needs of the present and future Design for change in form including alterations or replacement of non-structural parts Likely to involve planning, building control and 'wet trades'	MEP Fan coil solution providing tenant opportunity to insert suspended ceiling if required. Shell and core MEP design concept at this stage to facilitate varied commercial fit-outs from cellularised to agile workspace. Centralised AHUs capable of serving potential D1 or B1(b) uses. Structure of the lower levels of the proposed tower have been designed for flexible medical spaces or research & development, which can be converted to other uses, such as office or residential.	
	Flexibility	Design to meet the needs of the present and future Design for change in form including alterations or replacement of non-structural parts Likely to be pre-agreed with planning and building control and not involve 'wet trades' or waste	A localised ventilation system for the office floors that is adaptable for the specific occupant needs. Enhanced ventilation rate that exceeds BCO recommendations which enables adaptability. Floor plates designed with flat soffits allows a flexible services distribution, which associated with the proposed structural grid allow the reconfiguration of the spaces within the floor plate.	
	Reusability	Design using high demand, standard dimensions and specifications Use modules or reused kit	The ventilation units (HRUs - Heat recovery units) located on the soffit, is of a standard size which can be re-used elsewhere. Standardized structural grid with generous floor to ceiling dimensions provides opportunity for modular design using recognised planning-grid compliant dimensions	
	Recoverablity	Design to be deconstructed and reused or recycled Prevent unusual parts, dimensions or specifications	Standards dimensions are used for recoverability where feasible. Proposed reinforced concrete frame can be recycled at the end of the design life of the building. Connections of steel elements to be with bolted connection to facilitate its deconstruction and reuse.	

Operational running and conserving in use resources				
Circular economy approach for the operation of the development	Energy Consumption	Low consuming systems Effective monitoring Ensure occupant knowledge	Energy meters to monitor a minimum on 90% of all end uses BMS to collect occupant data Building user guide to ensure the occupants are able to use the systems efficiently All electric systems to prevent NOx emissions	49.5% reduction in operational CO2 emissions
	Water Consumption	Low flow fittings Effective monitoring Ensure leak detection is in place	Sanitary fittings specified to be low flow to conserve water Water meter connected to the BMS to monitor usage Occupant will be alerted of any leaks with the detection systems connected to the BMS	40% reduction in water consumption over the BREEAM Baseline
	Waste Management	Appropriate sized storage space Waste collection strategy Encourage recycling Diversion from landfill	A dedicated waste storage area for the developments different uses To encourage waste separation, separate bins will be provided for general waste, recycling and where applicable composting The space will be easily accessibly by the occupants and the bins will be labelled	65% municipal waste recyling rate by 2030

5.1 Circular Economy Principles

The following sections provide additional details of the circular economy opportunities within the proposed development. This expands on the Strategic Approach outlined in the previous section. The nine circular economy principles intend to decouple economic activity from the consumption of finite resources and designing waste out of the system. This is accompanied by transitioning to low waste and eventually a closed loop system.

Minimising the quantities of materials used

The Proposed Development is taking a 'whole life' view of waste, aiming to tie waste targets in with the WLC process and opportunities to embrace circular economy principles. The process begins with an assessment and quantification of the ability to reuse materials from existing structures and buildings on the development site, prioritising reuse in the new development where possible/suitable. These materials should be considered alongside new materials and construction techniques that support a low-waste ethos, using the frameworks and approaches set out to help design out wastage, as well as inform and drive selection of materials and products which help realise this goal. Further to this, suitably onerous site waste targets should be set both for the production of construction waste and for diverting excavation, demolition and construction waste from landfill. The third part of this process is ensuring that suitable facilities and management procedures are in place to support a low-waste operational culture, which ensures waste is managed effectively through design, construction and operation.

"Using less" material in design and embracing material efficiency exercises are two of the most important methods of ensuring efficient resource use and are identified by the UKGBC as some of the most effective ways of reducing a development's embodied impact. Designing to use less should always supersede the choice of low carbon materials in the design decision-making process, because very few things are more sustainable that a material that isn't there in the first place.

Integration of material efficiency into decision-making supports the aims of the development. The construction process should be managed to reduce waste creation, including careful material specification and use of prefabrication where appropriate. Engagement with material efficiency processes is strongly linked to reduced wastage and effective management of construction materials, as well as supporting more onerous waste performance targets.

The project team have been integrating material efficiency processes into design decision-making from the earliest project stages, where it also meets the wider goals of the project beyond sustainability. Part of this is influenced by the pre-demolition study; being able to use materials from the existing building to offset the consumption of new resources is a strong strategy towards using less material, and the audit will be used to steer and support these decisions during the next stages of design development. BREEAM 2018 also supports the material efficiency process, with strong influence from many of the materials and waste credits, which have been selected to support the project materials and waste approach. The Mat06 credit section in particular deals specifically with material efficiency and has been targeted by the project team.

Minimising the quantities of other resources used

Please refer to the water and energy sections above for details on the efficient equipment.

During construction the contractor will be required to monitor energy, water, and transport and report the final figures.

Specifying and sourcing materials responsibly and sustainably

The proposed development will seek to ensure that the principles of sustainable procurement are ingrained within the materials decision-making process. Ensuring that products are procured sustainably is a key feature, which requires the preparation of a 'sustainable procurement plan', with a focus on local sourcing, encouraging the use of materials with high recycled content and procuring low carbon materials. The

BREEAM 2018 process is particularly effective in this regard, specifically within the Mat 03 credit section which can be used to steer success.

The preferred process will be established within a project Sustainable Procurement Plan (SPP). The SPP will follow the RIBA 2020 Plan of Works, specifically picking out key sustainability goals and aligning this with activities around sustainable procurement. This process also aligns closely with other material and waste considerations of the project; the WLC analysis, requirement for EPD, material efficiency measures, adaptability to climate change, pre-demolition audit and general project waste aspirations are all influenced by the SPP. The SPP will also capture the key themes required by the BREEAM 2018 Mat03 process, which sets out what is expected from these documents.

The SPP will include advice and measures to influence sustainable procurement of a number of key material groups, including concrete, steelwork and aluminium amongst others. The contents of the Procurement Plan can largely be split into 6 cores 'themes', which contribute to the decision-making process when selecting sustainable materials. This includes a requirement to consider sourcing distances of materials but also respecting the fact that the WLC study often demonstrates that transport impacts (from factory gate to site) in the majority of cases are small overall proportion of whole life material impact. Therefore, those associated savings will be weighed up against other potential savings in the whole life context, to ensure that decision-making is informed by the myriad considerations that constitute a successful WLC process.

The implementation of the above will be monitored through the project procurement phases and into construction, to ensure that the requirements are upheld. It is likely the outputs of the SPP will be used to inform Pre-Qualification Questionnaires (PQQs) for potential material suppliers for the Proposed Development, to ensure that the aims of the plan are implemented. Regular review of the SPP will also take place throughout the project, in line with project progression against the RIBA Plan of Works. This will ensure that the SPP is able to influence project decision-making, rather than be an early-stages BREEAM item that is then ticked off and forgotten. This is a good example of how BREEAM methodologies are used as a framework approach to drive value in sustainable design.

Some key materials will have mandatory requirements in respect of responsible sourcing. 100% of timber products used within the scope of the Proposed Development, be that in temporary works, formwork or in construction itself, will be procured in accordance with the UK Government's Timber Procurement Policy, and will be required to carry FSC (or equal approved) responsible sourcing certification. The project team understands that failure to comply with this standard will result in the inability to secure any BREEAM rating for the project, and therefore compliance is essential.

A minimum of 20% of the total value of materials used will derive from recycled and reused content in the products and materials selected, in line with published GLA Circular Economy Guidance Pre-Consultation Draft and WRAP recommendations.

Design for longevity, adaptability or flexibility and reusability or recoverability

The development team recognise that design for minimised whole life carbon impact does not just relate to the capital embodied carbon and the operational impacts of the building systems over time. This is reflected in the choice of benchmarking standards (RIBA 2030 Climate Challenge) that provide a whole-life overview and analysis basis. Facilitating future flexibility has the ability to reduce waste and costs associated with future fit-out or refurbishment works, improves the ability to cost-effectively reuse and recycle materials, increases the lifetime value of materials and products, and encourages circular thinking.

The BREEAM 2018 Wst 06 credit section deals specifically with design for disassembly and the potential for future functional adaptability of spaces. The credit has been targeted for this development. The intent of the early stage assessment (before the end of RIBA 2), is to collate thoughts and ideas on how future flexibility will be achieved, considering structural, architectural and MEPH engineering strategies to support this.

The Strategic Approach table confirms the approach for adaptability and longevity for the proposed development.

Design out construction, demolition, excavation, and municipal waste

Sustainability and environmental considerations must also be managed throughout construction of the development if the intent within this application document is to be upheld.

Effective monitoring and recording of site waste will also be a requirement of the project, again, driven largely by the BREEAM 2018 assessment process. Resource Management Plans (RMP) will be required for both construction waste, and demolition waste. Draft versions with waste estimates, and calculations showing how the project waste targets might be achieved are required prior to construction, and these should be checked against the final RMP documents with actual site waste to assess the effectiveness of target setting and demonstrate 'lessons learned'.

Manage demolition waste

Redevelopment of the site to include the demolition of existing buildings, retention and refurbishment of the warehouse and the erection of a ground, mezzanine and 18 storey building (with plant at roof) and 3 basement levels, comprising of café and community space within the warehouse and within the new building office, flexible medical and research and development, and flexible retail and affordable workspace, alongside cycle and disabled car parking, servicing, refuse and plant areas, public garden (including soft and hard landscaping), highway improvements and all other associated works.

A warehouse demolition plan was produced to determine which elements will be retained. The following is a summary:

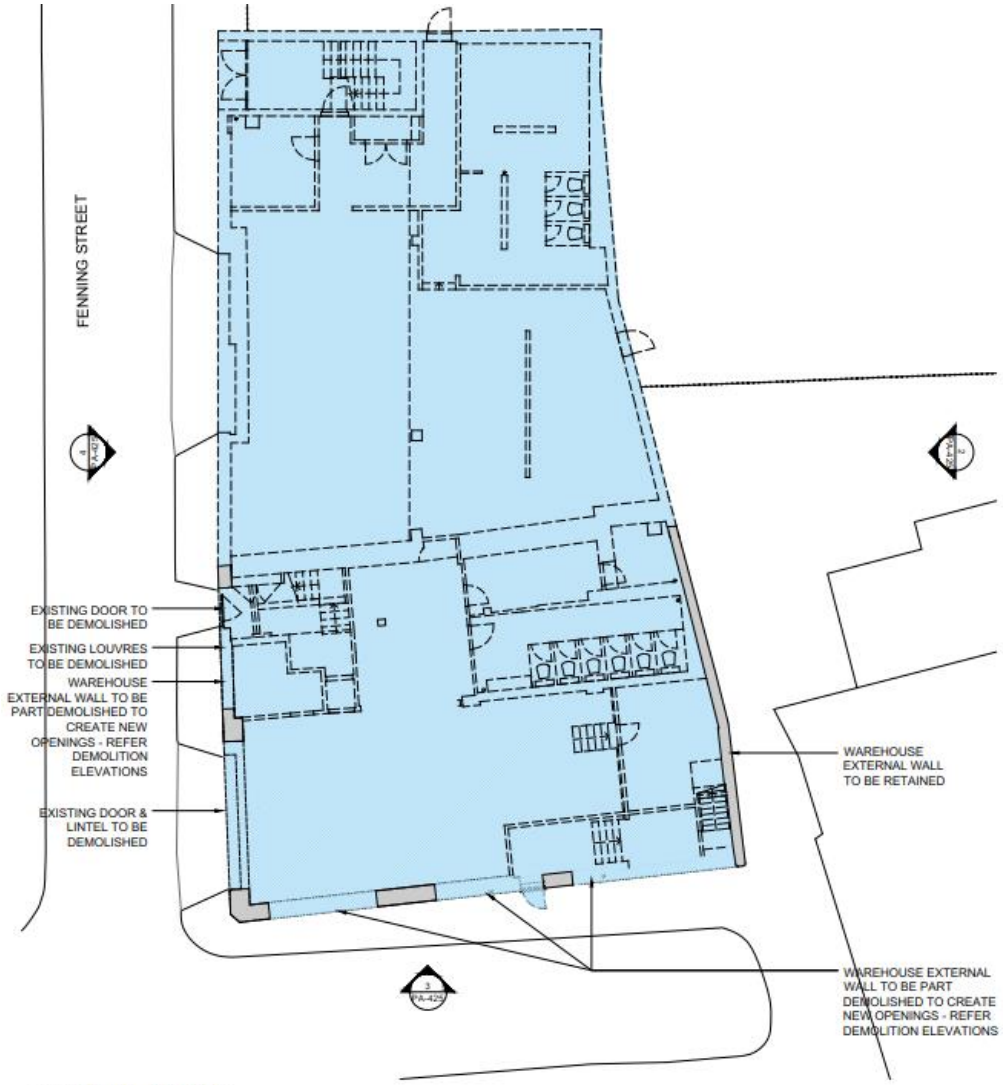
- Existing doors to be demolished
- Existing louvres to be demolished
- Warehouse external walls to be part demolished and part retained

Waste Targets

Demolition – 95% diverted form landfill

Construction – 7.5m^3 per 100m^2 (GIA)

Operational – 65% recycling rate by 2030



1 PLAN - LEVEL 0
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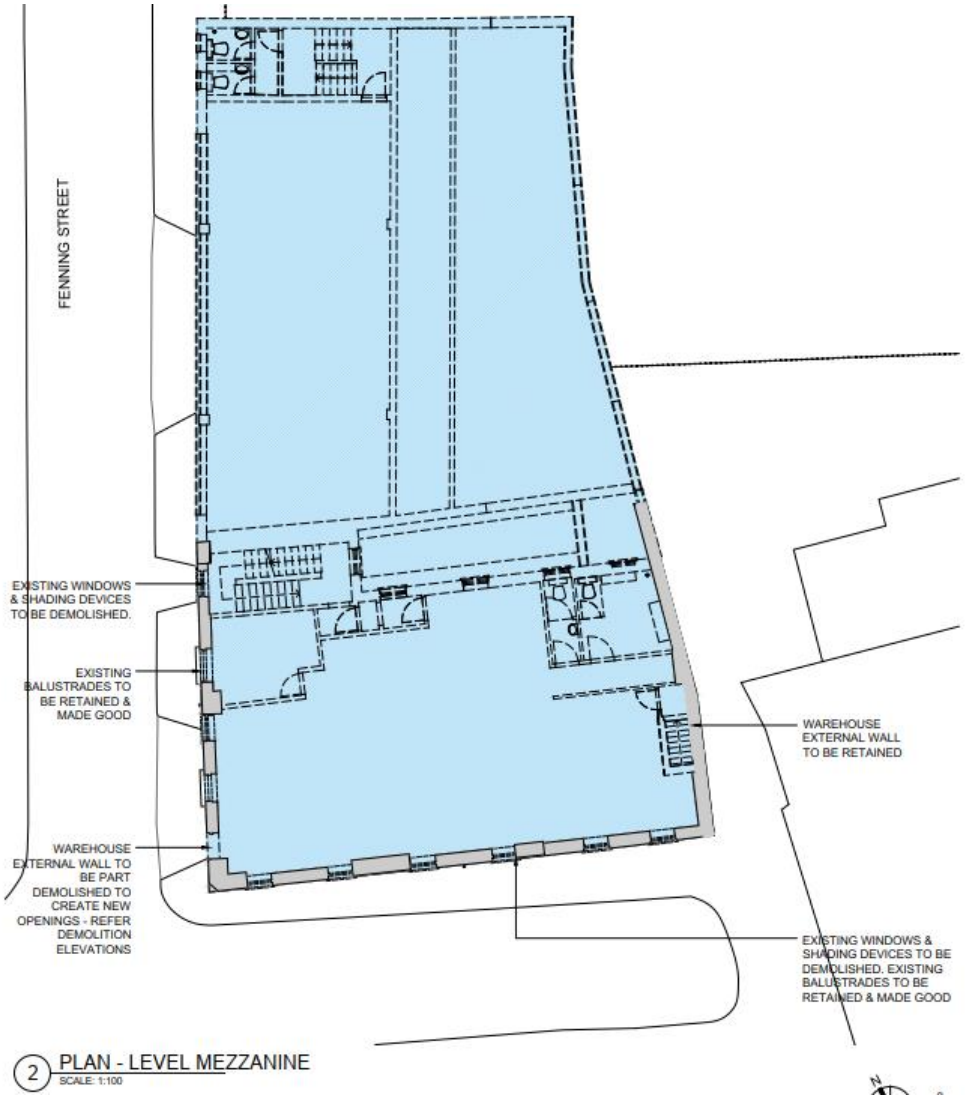

Manage excavation waste

A minimum of 95% of excavation waste generated by the project works will be diverted from landfill for beneficial use in line with the GLA London Plan, Policy SI 7 *Reducing waste and supporting the circular economy.*

Manage construction waste

In the next stage of waste management for the Proposed Development, onerous waste management targets will be set for excavation, demolition and construction waste generated by the development. The 'Preferred Standards' set out in Southwark Sustainable Design & Construction SPD (2009) Section 11.5 requires 95% of all construction, demolition and excavation waste to be diverted from landfill and reused or recycled. These targets also tie in with the approach of quantifying and identifying potential materials for reuse directly on site as well as recycling offsite through other applications.

The current waste management targets are set at less than 7.5m3 of construction waste generated per 100m2 (GIA). Diversion from landfill targets will achieve and exceed the Southwark requirements of 95% of demolition and construction waste diverted from landfill.

The targets set for the Proposed Development in respect of diversion of resources from landfill are more onerous than those required by the BREEAM 2018 assessment, which only requires 80% by tonnage

construction waste / 90% by tonnage of demolition waste to be diverted from landfill. This demonstrates the strong intent of the project to manage waste associated with construction sustainably and in accordance with current best-practice.

In contrast, the BREEAM 2018 targets in respect of construction waste have consistently proved to be onerous for developments to achieve, which is suggestive of why these targets have not been upgraded by BRE since the 2011 version of the BREEAM. Achieving 2 no. credits of the 3 no. available for construction resource efficiency is notoriously difficult; this is less about how the contractor manages waste on site, and more about how the development is designed with low waste in mind as part of the sustainability approach. Reflecting the fact that this approach is ingrained within the sustainability story for the Proposed Development, the project is targeting 2 no. credits for Wst 01 construction resource efficiency, equating to a target of < 7.5m^3 construction was per 100m^2 GIA. This target, set at an early project stage, is deemed tough enough to drive low-waste performance.

Manage municipal waste

Another key aspect of whole life waste consideration is how waste is managed during the operation of the building and ensuring that adequate provision is provided to support building occupants in their sustainable waste decision-making. This is typically through the provision of facilities for recycling, and composting of organic waste streams, and through the accessibility of these services to building occupants, and facilities management teams. Lack of such facilities can undermine the strong low-waste approach set out during design, and construction of the Proposed Development.

All commercial uses at the development site will be provided with access to a designated refuse store. The store will be accessible at basement level via two service lifts located by the Fenning Street frontage of the site. Suitable manoeuvring space will be provided for containers to be transferred to / from the store. Eurobin compaction will also provide 1/3 compaction to reduce the overall volume of storage required.

Waste will be collected daily. Prior to collection, site management staff will transfer waste containers via either of the two service lifts to a temporary waste storage room located at ground floor level. The temporary waste store is located in close proximity to the site's service access and service lifts. Waste containers will then be transferred to and from the site's loading bay and refuse collection point, located on the eastern side of Fenning Street. Waste containers will then be returned to the basement level waste store.

Requirements for operational waste management are also driven by the BREEAM 2018 credit process, particularly the Wst 03 credit, which is a mandatory credit for the achievement of BREEAM 'Excellent'. The requirements include better separation of recyclable waste streams, labelling, and provision for cleaning facilities associated with organic waste. The BREEAM Wst 03 credit it targeted for the Proposed Development.

5.2 Key Commitments

The key commitments are required to be submitted for the Detailed Circular Economy Statement and will be submitted in draft form as part of the outline planning stage.

	Site	Substructure	Superstructure	Shell/ Skin	Services	Space	Constrcution	Relevant BREEAM Credits	Challenges	Counter Actions	Plan to prove
Conserve Resources											
Minimising the quanities of materials used	Recycle demolition waste where feasible	Reuse of existing foundations where possible for the retained building (warehouse) Efficient foundation design with pile raft foundation solution to optimise number of piles required. Solution for retaining wall developed to the temporary and permanent support to the surrounding retained ground and buildings.	Reuse of the existing structure where possible for the retained building (warehouse). Optimization of the grid for optimum floor thickness and planning module taking into account use of the floor plates. Optimization of the core walls thickness along the height of the tower.	Use of light weight materials	Optimisation of mechanical design ensuring that systems are not oversized.	Efficient use of internal space Reduce the need for partitions		Mat 01, Life Cycle Assessment & Mat 06, Materials efficiency			
Minimising the quantities of other resources used (energy, water, land)		Efficient use of space provided on the site			Reduce operational energy. Low flow sanitary fittings. All electric energy strategy proposed. ASHPs capable providing simultaneous heating and cooling are proposed, enabling heat recovery between heating and cooling systems. High efficiency and variable output HVAC plant equipment proposed to minimise energy usage. Low energy light fittings. Energy and water consumption monitoring by BMS plus building user trainaing and a Handbook to make the occupants aware of their energy use and how best to optimise and improve.			Man 03, Respponsible Construction practices, Ene 04, LZC & Wat 01 & Water Consumption & Wat 04, Water efficient equipment & LE 01 Re-used land			

Specifying and sourcing materials responsibly and sustainably		Maximise the percentage of recycled content of the structural steel and the use of recycled aggregates in the reinforced concrete elements. Investigate sourcing construction materials as locally as possible.	Recycled content study	Review material specified during next stage of design.			Mat 01, Life Cycle Assessment & Mat 03, Responsible Sourcing of Materials & Wst 02, Recylced aggregates			

Design to eliminate waste and ease of maintenance										
Design for reusability, recoverability, logevity, adaptability and flexibility		All sub and super structure has been designed for flexible use between level 1 and 10, so they can be adapted for a potential change of use. Upper levels of the tower designed for offices can also be adapted for other uses with less onerous loading and vibration criteria.		The HVAC systems and on-floor installations are designed to allowed for flexibility and adaptability in use and tenants future fit-out, in order to minimise wastage in materials and resources, and facilitating ease of maintenance.			Mat 01, Life cycle assessment, Mat 05, Designing for durability and adaptability & Wst 06, Design for disassembly and adaptability			
Design out construction, demolition, excavation and municipal waste arising		Recycled and secondary aggregates to be specified as possible.					Wst 01, Construction waste management incl. pre-demolition audit & Wst 02, Recycled aggregates & Wst 03, operational waste & Man 03, Resposnible cosntruction practices			

Manage waste											
Demolition waste management		To be crushed and used as aggregate.	To be separated and recycled where possible.		To be separated and recycled where possible.		To be managed by contractor	Wst 01, Construction waste management , pre-demolition audit & Man 03, Resposnible cosntruction practices			
Excavation waste management					n/a		To be managed by contractor	Wst 01, Construction waste management , pre-demolition audit & Man 03, Resposnible cosntruction practices			
Construction waste management			To be separated and recycled where possible.	To be separated and recycled where possible.	To be separated and recycled where possible.		To be managed by contractor	Wst 01, Construction waste management , pre-demolition audit & Man 03, Resposnible cosntruction practices			
Municipal waste management			To be separated and recycled where possible.	To be separated and recycled where possible.	To be managed by contractor.	Bin Stores, with segregated storage provided for each unit.	To be managed by contractor	Wst 03, Operational waste			

5.3 Bill of Materials

The bill of materials is indented to encourage teams to reduce material intensity and maximise the amount of content that is responsibly and sustainably sourced. This information will be available at Stage 3 of the project and a copy of the template confirming the 20% overall recycled content.

Layer	Element	Material quantity (kg)	Material intensity (kg/m2 GIA)	Recycled Content (%)	Responsible Certification	Potential for disassembly	Evidence
Structure							
	Foundation			*Minimum 20%*			
	Floors			*Minimum 20%*			
	Roof			*Minimum 20%*			
Shell/ Skin							
	Cladding			*Minimum 20%*			
	Curtain walling			*Minimum 20%*			
Space							
	Partitions			*Minimum 20%*			
	Carpet			*Minimum 20%*			
	Tiles			*Minimum 20%*			
	Sanitary fittings			*Minimum 20%*			
Total				20%			

5.4 Recycling and Waste Reporting

Category	Total Estimate	Of which…				Evidence
	t/m2 GIA	% reused or recycled onsite	% reused or recycled offsite	% not reused or recycled		
				% to landfill	% other management	
Excavation waste		Minimum 95%				
Demolition waste	≥90% (weight)	98%		2%		
Construction waste	≤ 7.5 m3/100m2 GIA	95%		Max 5%		
	t/annum	% reused on or off site	% recycled or composted	% not reused or recycled		
				% to landfill	% other management	
Municipal waste	tbc	Minimum 65% (by 2030)		Max 35% and no recyclable or		

5.5 Implementation

In line with Circular Economy principles, the main priority is to extend the lifetime of the building through careful design and specification through the measures listed above. However, in addition, at detailed design stage a 'disassembly manual' will be developed that provides guidance on which materials, elements or components can be reused, recycled or composted; and how to disassemble the building to minimise wastage and facilitate reuse, recycling or composting.

5.6 End of Life Strategy

The Circular Economy Principles guide the design and specification to extend the buildings life using the measures incorporated by the design team. To ensure that the design aspects can benefit the development at its end of life, a Disassembly Guide could be developed. This will provide guidance on the materials and components that can be reused or recycled, on or off site. The primary aim of this is to prevent unnecessary waste in line with the circular principles.

The Disassembly Guide will use information provided by the design team to ensure the key considerations and principles adopted are implemented at the end of life. The different disciplines from the design team will contribute to the appropriate sections of the Guide. The sections will be separated out into the different buildings elements and will include details on the material type, reusability, disassembly principles applied and recycled content.

The Guide will be given to the building owner and should be passed on to future owners where relevant.

The Post completion report will be submitted to the local authority and the GLA outlining the predicted and actual performance against the targets above.