Ham Close Regeneration

Planning Application:

Detailed Circular Economy Statement

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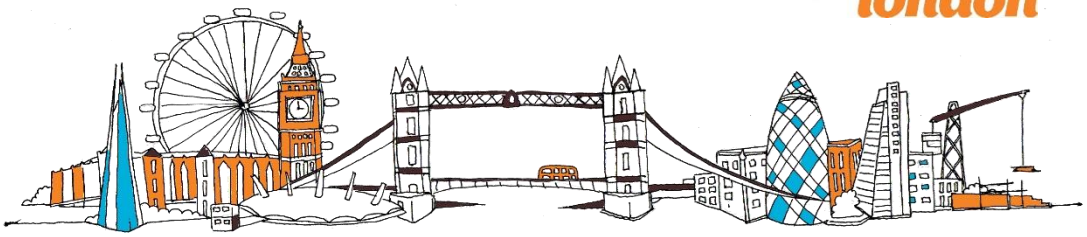
Detailed Circular Economy Statement

Ham Close Regeneration

On behalf of Hill Residential

R02

Date: April 22



REVISION HISTORY

Revision	Issue Date	Description	Issued By	Checked By
R00	17/03/22	First issue	JA	TW
R01	07/04/22	Updated with Comments	JA	-
R02	27/04/22	Updated plans	JA	-

Calculations contained within this report have been produced based on information supplied by the Client and the design team. Any alterations to the technical specification on which this report is based will invalidate its findings.

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1. EXECUTIVE SUMMARY

This Circular Economy Statement has been produced by Energist UK on behalf of Hill Residential ('the Applicant') and demonstrates compliance with the requirements set out in the GLA London Plan Policy SI7 '*Reducing waste and supporting the Circular Economy*', following the guidance outlined in the GLA '*Circular Economy Statements (2022)*' guidance document.

It supports a full planning application for the regeneration of Ham Close. The Development proposals comprise the demolition of existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to 3 storeys in height, a "MakerLabs" (sui generis) of up to 2 storeys together with basement car parking and site wide landscaping.

This circular economy strategy was developed in collaboration with the Design Team and Developer, following a virtual workshop held on 22nd September 2021. The workshop minutes are detailed in the Appendices. An overall strategic approach has been identified for both the existing buildings on the site and the proposed new development.

A number of key commitments and design strategies have been identified to ensure the Development will contribute towards a circular economy. These involve design decisions to minimise resources used, minimise waste and strategies to manage waste effectively. The Strategic Approach has been defined in Appendix 1, with core commitments described in Section 4, following the Circular Economy Core Principles. A summary of key commitments, an estimate Bill of Materials, and recycling and waste reporting targets are presented in the Appendices.

2. INTRODUCTION

2.1 Development Summary

This report summarises the Circular Economy strategy for the regeneration of Ham Close. It details the approach taken by the Applicant and Design Team to support a circular economy and to incorporate the GLA Circular Economy Core Principles within the Development design.

The Development proposals comprise the demolition of existing buildings on-site and phased mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to 3 storeys in height, a “MakerLabs” (sui generis) of up to 2 storeys together with basement car parking and site wide landscaping.

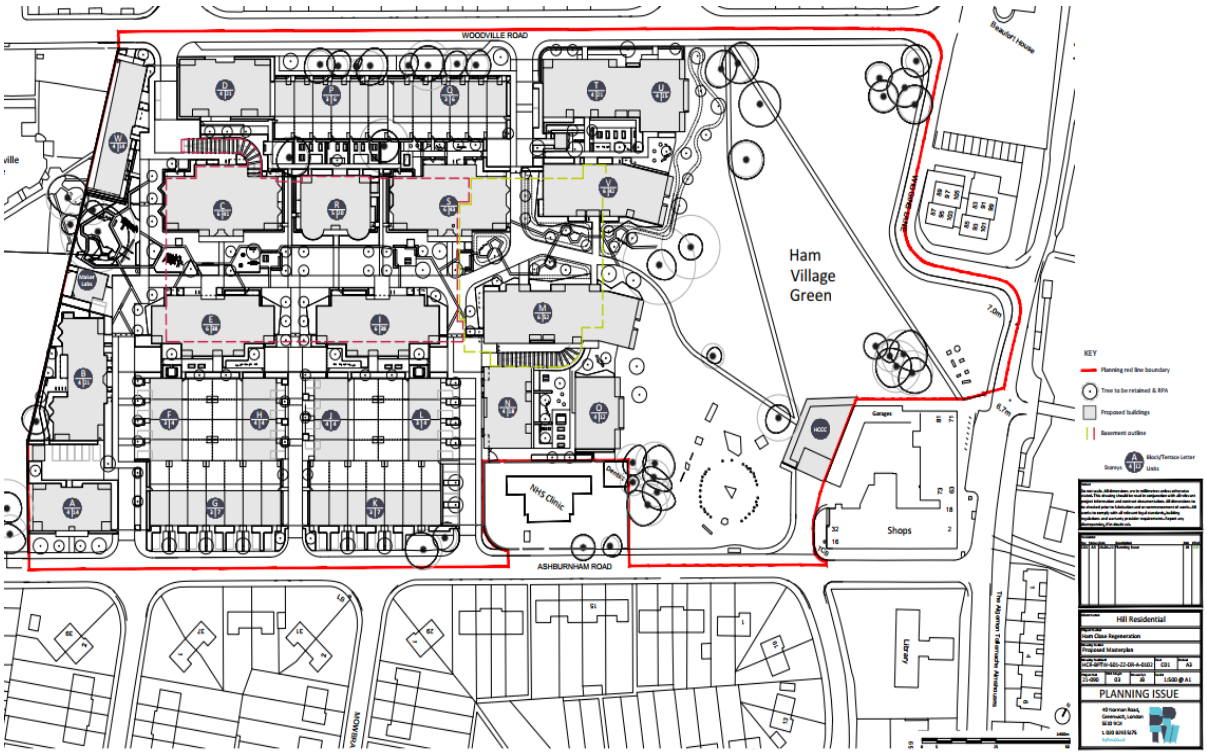

Figure 1 – Masterplan providing an overview of the site layout (BPTW drawing HCR-BPTW-S01-ZZ-DR-A-0102-C01)

Table 1 - Proposed floor area for development and number of apartments

Area of Development	Planning Use Class	GIA (m2)	No. Apartments
Residential	C3	41,817.4	452
Community Facility	F2	716	-
Maker Labs	sui generis	130	-

2.2 Circular Economy Definition

A Circular Economy is defined in the GLA London Plan (2021) Policy SI7 '*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. The end goal is to retain the value of materials and resources indefinitely, with no residual waste at all. This is possible, requiring transformational change in the way that buildings are designed, built, operated, and deconstructed.

A circular economy stands in contrast to our current linear system, where materials are mined, manufactured, used, and thrown away. The '*Take, Make, Dispose*' model, or '*Linear*' economy, has fuelled rapid growth but is inherently unsustainable in the long term where resources are finite.

Figure 2 - Circular Economy Concept - migrating from a linear economy towards a circular economy. Source: Circular Flanders

Widespread adoption of circular economy principles would dramatically reduce the quantity of new material imported into London and the amount of waste needing to be managed, including that which is exported. Alongside this reduction in imported material and exported waste, smart technologies, infrastructure, and logistics can contribute significantly to reduced vehicle movements, air pollution, noise, and greenhouse gas emissions. Developers can also benefit from cost savings, for example by purchasing fewer materials and managing less waste.

Circular Economy Statements are intended to demonstrate how a development, including any public realm, and supporting infrastructure, will incorporate Circular Economy Principles into all aspects of the design, construction, and operation process. This will help to ensure that applicants:

- consider strategies to facilitate the transition towards a circular built environment
- report against numerical targets that will facilitate monitoring of waste and recycling
- recognise opportunities to benefit from greater efficiencies that can help to save resources, materials, and money.

2.3 Planning Targets

The Mayor of London wants to see London's homes, buildings and supporting infrastructure adopt innovative design. London Plan policies D3 '*Optimising site capacity through a design-led approach'*, and SI7 '*Reducing waste and supporting the Circular Economy'* set out a policy framework that supports the delivery of a circular built environment.

Policy SI7 of the London Plan also requires development proposals that are referrable to the Mayor of London to submit a Circular Economy Statement as part of a planning application.

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

1. promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
2. encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products

3. ensure that there is zero biodegradable or recyclable waste to landfill by 2026
4. meet or exceed the municipal waste recycling target of 65 per cent by 2030
5. meet or exceed the targets for each of the following waste and material streams:
    i. construction and demolition – 95 per cent reuse/recycling/recovery
    ii. 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.

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

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

2.4 Method Statement

This circular economy report was developed in line with the London Plan Policy SI7, following the guidance outlined in the GLA '*Circular Economy Statements (2022)*' guidance document.

This circular economy strategy has been developed in collaboration with Hill Residential and the appointed design team following a workshop held 16th August 2021. The workshop minutes are detailed in the Appendices. The workshop was used to facilitate circular economy targets and to ensure these have been integrated into the design and implementation strategy (Section 7). The structure of the workshop was to identify opportunities and measures incorporated into the Development design which minimise waste in line with the GLA Circular

Economy Core Principles and the waste hierarchy for the existing site, new development, the Development in use and end of life.

2.5 Circular Economy Aspirations

A Circular economy is one where materials are retained, reused, and recycled at their highest value for as long as possible, with the ultimate goal of having no residual waste at all. To make this possible requires dramatic change in the way buildings are designed, built, operated, and deconstructed. Achieving a more circular economy will dramatically reduce the requirement for virgin materials and resources, as well as reduce the amount of waste produced.

The proposed design responds to the circular economy principles outlined in the GLA Circular Economy Statement Guidance (2022); Conserve resources and source sustainably, Design to eliminate waste, and Manage waste sustainably and at the highest value, as well as identifying and incorporating London Plan Policy SI 7 targets.

The circular economy aims and targets are detailed in Section 3: Strategic Approach below, which align with the London Plan Policy SI 7 targets and follow the waste hierarchy as outlined by the GLA.

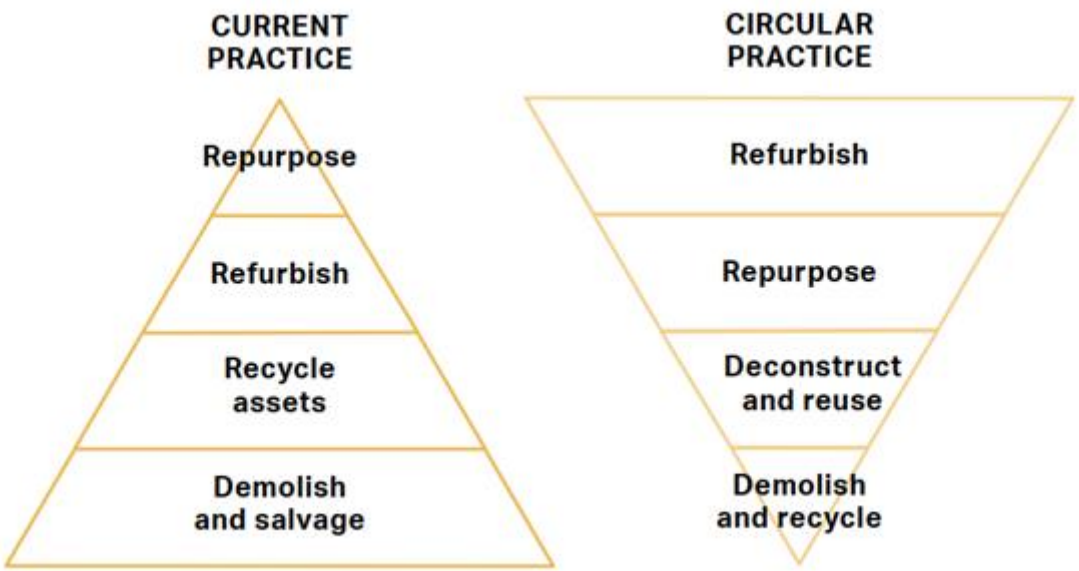

Figure 3 - Circular Economy waste hierarchy. Source: Adapted from GLA

3. STRATEGIC APPROACH

The strategic approach for the regeneration of Ham Close was developed in collaboration with the Design Team and Developer, following a virtual workshop held on 22nd September 2021. The workshop minutes are detailed in Appendix 5. The GLA decision tree was used as reference to define the strategic approach, as highlighted below. The specific commitments, targets and metrics identified are reported in Section 4, making reference to the core circular economy principles on a building layers basis.

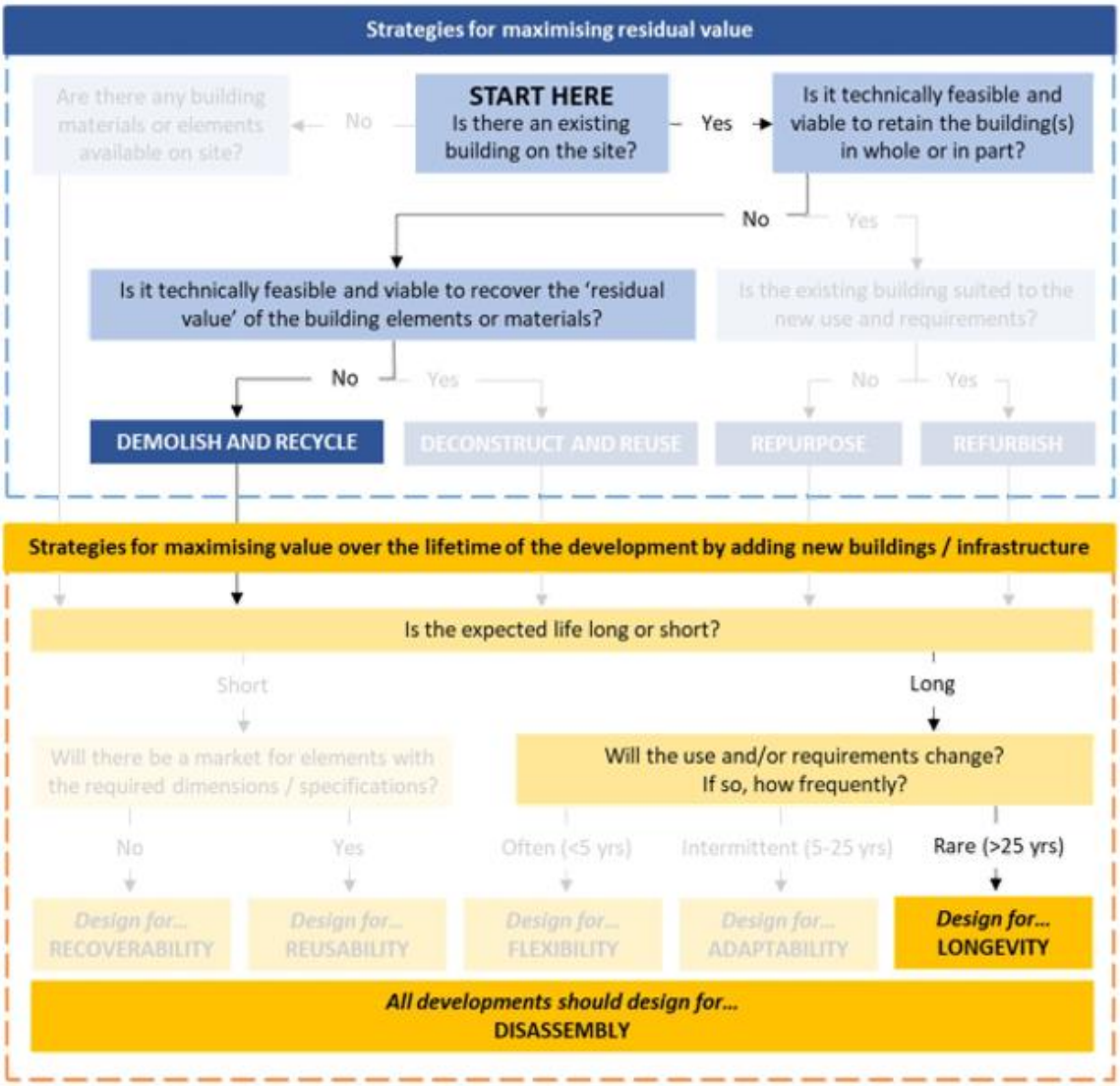

Figure 4 - Circular Economy decision tree for the proposed development. Source: Adapted from GLA

3.2 Circular economy approach for the existing site

The site is located on Ham Close, between St Richard's CE Primary School and Ham Street/Wiggins Lane, in a predominantly residential setting. The site is an existing Richmond Housing Partnership (RHP) owned estate, with 6 small parcels of land owned by the London Borough of Richmond Upon Thames. An agreement is in place for RHP to purchase the parcels to enlarge the development site. The site has 14 existing residential blocks, plus some ancillary uses including garages. The site is allocated in the local plan for redevelopment.

The site has also been allocated for regeneration within the draft Richmond Local Plan *'The best for our borough' Draft for consultation* (December 2021). It is noted that the existing flats are generally of poor construction, with poor insulation by modern standards, and many have condensation and damp issues. The blocks of flats do not have lifts, thus leaving a number of flats inaccessible to people with disabilities.

The under-occupied existing site has been selected to be regenerated to provide a mixed-use development comprising 452 residential homes (Class C3) up to six storeys; a Community/Leisure Facility (Class F2) of up to three storeys in height, a "MakerLabs" (sui generis) of up to two storeys together with basement car parking and site wide landscaping.

The strategy for the existing buildings on the Development is to deconstruct and recycle the materials. A pre-demolition audit will be conducted to fully identify the primary materials on the site and the potential options for reuse and recycling, both on-site and off-site.

3.3 Circular economy approach for demolition and construction

The proposed new development is a long-life development. As a residential led scheme, it is not intended for regular change and as such shall primarily be guided by the principles and requirements for longevity. As such these sections of the Development shall be designed to meet long term needs while being durable and resilient to a changing climate. These areas have had internal layouts fully designed to optimise the usage of the internal space, met by utilising an intelligent grid to maximise future adaptability.

Dynamic Simulation modelling shall be undertaken in accordance with CIBSE TM59 'Design methodology for the assessment of overheating risk in homes', TM52 'The limits of thermal

comfort: avoiding overheating in European buildings', and a ventilation strategy will be developed to demonstrate successful mitigation from the risks of overheating in accordance with CIBSE TM49 weather data climate scenarios.

The Development design will ensure significant carbon savings are achieved over the Part L baseline and reduce the site energy consumption through a highly efficient building fabric design. The proposed energy strategy is to implement a site-wide communal heat network with the heating demand supplied by high efficiency heat pumps (ASHP). This will supply efficient and low carbon space heating and hot water to all units. The renewables contribution will be from the inclusion of solar photovoltaics (PV) to suitable roof spaces. With the continual decarbonisation of the national grid, this provides a pathway for the Development to meet net zero carbon in the future.

As far as practicable, the Applicant shall look to maximise the use of recycled content within the Development where feasible. The use of pre-fabricated elements shall be prioritised, as these reduce construction waste, and include the use of precast floors and stairs.

3.4 Circular economy approach for municipal waste during occupation

The Applicant shall provide refuse and waste storage in accordance with the London Borough of Richmond upon Thames requirements. Easily accessible communal waste storage shall be provided, with each residential core having its own waste and recycling stores on the ground floor. Waste storage shall be segregated by waste streams to maximise recycling rates. Bin stores shall be provided for houses to neatly accommodate all Local Authority recycling and waste containers to encourage recycling rates.

The Applicant is committed to delivering a management framework, which shall be developed for waste management, energy monitoring, and water monitoring for the site in operation. This shall help deliver the 65% recycling of municipal waste by 2030 target.

4. CIRCULAR ECONOMY NARRATIVE

4.1 Circular Economy Narrative

Following a workshop with the project team, a number of key commitments, metrics, targets, and design strategies were identified which have been incorporated into the Development, and which contribute towards a circular economy.

These have been presented below, and follow the GLA Circular Economy Core Principles, and have been reviewed against the building 'layers', with reference to the GLA decision tree with regards to designing for a long-life building asset, looking at flexibility, adaptability, and longevity where appropriate.

A summary of these key commitments is provided in the GLA 'Table 2' template and provided in Appendix 2.

Table 2 - Core Principle 1 commitments

Core Principle 1: *Conserve resources, increase efficiency and source sustainably*	
1.1 Minimise the quantities of materials used	
Responsibility	Primary: *Client* Secondary: *Architect, Structural Engineer, MEP*
Timeframe	RIBA 3-5
Proposed Approach	Minimising materials - slab type, foundation type, façade construction has been considered within the WLC assessment to reduce embodied carbon and total building weight. This reduces the quantity of materials used in the construction process. Floor plates will be rationalised as much as possible to maximise material efficiency whilst achieving a balance between form factor and dual aspect provision. Repetitive design has been utilised throughout the masterplan to minimise quantities of materials without impacting architectural character, seven pairs of blocks share the same designs and unit types have been rationalised and replicated throughout the scheme. Building form factor will be optimised where possible to increase efficiency and thus reduce the comparative thickness of insulation and overall area of facade required.

	Basement designed so part of the temporary works structure, required to create a temporary watertight barrier to allow the phased construction of the basement, can be retained and used to provide permanent support to the completed structure. Community Centre fit-out to client specification – minimises the use of speculative finishes. Massing optimisation studies have been undertaken to review and reduce the overall building form and massing, thus reducing material quantum. Pre-fabrication – Standard bathroom and en-suite types across scheme minimises variation. Stair master, balconies, utility cupboards, bathroom pods etc. shall be considered from a prefabrication perspective. Minimising plant – The Development has been designed with a communal heat network which reduces the amount of plant equipment as apartments are served via a communal system. Overheating assessment confirms that the need for cooling plant is not required for domestic areas, which shall rely on natural ventilation. All apartment blocks feature a stacked design to minimise pipework and kitchens and bathrooms will be coordinated to minimise pipework where floorplates vary.
Metrics	Material intensity (kg/m2), embodied carbon intensity (kgCO2/m2)
Targets	GLA embodied carbon benchmark 750-850 kg/m2
Commitments & Measures	Standardisation and modularisation requirements must be agreed on by the design team, including the use of prefabricated elements. Specification clauses and contractual requirements to be incorporated at RIBA 4. A WLC Assessment has been completed as part of the planning application, which provides a material optimisation study to reduce the embodied carbon. This includes material intensity.
Implementation	Continuation of material efficiency workshops and coordination with the design team to evaluate embodied carbon and waste minimisation through design is maximised. As part of the tender process contractual obligations will need to incorporate targets, metrics, and specifications clauses which maximise opportunities to minimise quantities of materials used on site.
Challenges / Counter-actions	Value engineering, site constraints and programming. Ensuring that targets are achieved. Sufficient allocation of resources and an allowance within the programme will help ensure that material efficiency is reviewed at appropriate stages and kept as a key agenda item.

1.2 Minimise the quantities of other resources used	
Responsibility	Primary: *Client* Secondary: *Architect, Landscape Architect, MEP, Energy Consultant*
Timeframe	RIBA 3-5
Proposed Approach	Land Use - Site is allocated in local plan for redevelopment. A suitable low-density site (192 units) has been selected to be redeveloped to provide 452 residential units, representing a high efficiency use of land and space. The landscape design will seek to maximise the use of soft landscape where practicable to increase permeability and reduce extensive areas of hard surface. The planting strategies will seek to reflect local environments or habitats where practicable. Both these and the tree planting strategy will include consideration for native species. Energy Use - Highly efficient building fabric to reduce energy demand in line with GLA targets to achieve Be Lean carbon savings. Highly efficient services to reduce energy consumption to meet GLA targets. Delivered through an ASHP energy centre which offers excellent carbon reductions as the national grid continues to decarbonise. Energy and heat meters to be fitted to allow for careful monitoring of energy consumption by end-users. Maximising passive means such as the use of daylight; for example, stair wells, and minimise the need for electric lighting. Apartment block cores and stairs are situated adjacent to external facades where possible to allow daylight into stair wells and communal corridors Water Use - BREEAM targets for water monitoring and consumption for the commercial areas. Dwellings will have a maximum indoor water consumption of 105 l/person/day.
Metrics	Carbon emissions (t.CO2/yr), water consumption (litres/person/day), form factor
Targets	Form factor – 0.8 - 1.5 Energy – 10% Be Lean; 35% Be Green; Net Zero carbon offset Water – 105 l/p/d domestic, BREEAM WAT01 40% reduction non-domestic
Commitments & Measures	BREEAM assessment for non-domestic for energy, water, and ecology credits. Updated energy strategy to capture design and post construction SAP data verification to ensure that energy targets have been achieved. Part G water calculations to verify water consumption targets have been met (refer to Sustainability Statement).
Implementation	As per 1.1 Minimise the quantities of materials used, workshops reviews, specification clauses, and contractual obligations.

Challenges / Counter-actions	As per 1.1 Minimise the quantities of materials used, value engineering and site constraints. Sufficient allocation of resources and an allowance within the programme will help ensure that energy, water, and ecology are reviewed at appropriate stages and kept as a key agenda item.
1.3 Specify and source materials and other resources responsibly and sustainably	
Responsibility	Primary: *Client* Secondary: *Architect, Structural Engineer, Contractor & Supply Chain*
Timeframe	RIBA 4-5
Proposed Approach	Sustainable procurement - A Sustainable Procurement plan shall be developed for the site and is a targeted credit under the commercial BREEAM assessment. BREEAM Life Cycle Impacts assessment to be completed, with Green Guide ratings of A+ or A targeted for majority of major building elements. EPD certificates provided for major building elements – refer to Whole Life-Cycle Carbon Assessment. Opportunities to source materials locally will be prioritised. Local labour will be encouraged to reduce transport emissions during construction. Recycled materials – Review opportunities to use recycled aggregates and GGBS in the substructure and frame concrete. As a minimum a 20% target shall be set. Bricks from the demolition of the western boundary brick wall and the existing Maker Labs shall be reclaimed and re-used elsewhere on site. Aluminium and timber composite windows are proposed which will contain FSC certified timber and highly recyclable aluminium. Internal framing products to be specified with a high recycled content. All timber will be FSC certified. For the community centre facilities, investigating the use of timber structural components and timber internal finishes where feasible. The proposed window systems will potentially be a composite system incorporating aluminium and timber finishes. Proposing large format architectural masonry blocks with a recycled content of over 30% for the external envelope – these will also require less mortar joints compared to traditional sized brickwork i.e. meaning less cement is used in the envelope make-up.
Metrics	Recycled and reused material content.
Targets	Implement sustainable procurement plan Min. 20% recycled or reused content for all major building elements BREEAM MAT01 LCA Assessment BREEAM MAT03 Responsible Sourcing

Commitments & Measures	Development of specification to incorporate clauses relating to minimum recycled or reused content. In-line with Policy SI 7 this will aim to better the 20% minimum target for major building elements. BREEAM design stage assessment for MAT01 LCA and MAT03 Responsible Sourcing.
Implementation	Implement monitoring and reporting procedures to ensure opportunities are realised by contractors and their supply chain partners.
Challenges / Counter-actions	There is a risk that the sustainable procurement plan is not implemented throughout the supply chain. The design team will need to ensure that all relevant specification clauses and drawings are appropriately referenced and included within the tender pack and forms a contractual obligation.

Table 3 - Core Principle 2 commitments

Core Principle 2: Design to eliminate waste (and for ease of maintenance)	
2.1 Design for longevity, adaptability or flexibility and reusability or recoverability	
Responsibility	Primary: *Client* Secondary: *Architect, Structural Engineer, MEP*
Timeframe	RIBA 3-4
Proposed Approach	Site approach – The Development is a regeneration scheme of a development no longer fit for purpose and has been identified as a regeneration site under Local Plan policy. The current proposals are not prohibitive of future reuse. Substructure and Superstructure approach - Use of a reinforced concrete frame which will last for at least the design life of the Development and can be extended with sufficient maintenance. Minimum design life of 50 years in accordance with Eurocode design standard requirements and LABC standards. Shell/Skin approach - External brick cladding and clay tile hanging will be used which will have a lifespan beyond the design life of the Development. The external skin will be predominantly brick, which is a natural, durable, and reusable material. Curtain walling system fixed to the structural slabs and soffits. This can be removed and replaced in the event of a major refurbishment and are easily accessible from outside of the building using mobile elevating work platforms (MEWP) or similar relevant machinery. Services approach - A dynamic overheating assessment has been completed to reduce overheating of the building in future climate scenarios. High efficiency

	interior and exterior LED lighting has been specified to reduce quantities and improve operational life span. There is a commitment to ensure that the Development is designed to allow future connection to a district heating network. Space/Finishes approach - Internal walls, non-structural to provide options for adaptability and refurbishment beyond the design life of the Development – columns, no block work specified maximises flexibility of spaces. Specify products which are componentised and can be repaired by replacing failed components, for example LED luminaires with replaceable lamps rather than chip on board luminaires. Specify products which are easily dismantled and do not have fixings such as screws etc. For the community facilities it is proposed that the services and fittings to be exposed as part of the overall internal aesthetic, therefore these elements will be easy to maintain and replace.
Metrics	BREEAM MAT05 - Designing for durability and resilience BREEAM MAT06 - Material Efficiency
Targets	Design with disassembly in mind for each building element on a building layer approach. Develop an end-of-life strategy for inclusion within the Operation and Maintenance (O&M) manuals.
Commitments & Measures	The Applicant and Design Team are committed to providing a robust and durable design which meets the requirements of longevity for the residential element and adaptability and flexibility for the community elements.
Implementation	As part of RIBA Stage 3 - 4, the team will continue to examine Circular Economy principles including the key issues of longevity, adaptability, flexibility etc. Workshops during detailed design to facilitate the inclusion for disassembly and end-of-life plans for key building elements. Inclusion of plans within the O&M manuals at RIBA 6 handover for future use.
Challenges / Counter-actions	Developing a comprehensive disassembly and end-of-life strategy may be challenging. Sufficient allocation of resources and an allowance within the programme will help ensure that these topics are reviewed at appropriate stages and kept as a key agenda item.
2.2 Design out construction, demolition, excavation, and municipal waste arising	
Responsibility	Primary: *Client* Secondary: *Architect, Structural Engineer, Contractor & Supply Chain*

Timeframe	RIBA 3-5
Proposed Approach	Site wide measures – A pre-demolition audit shall be conducted to evaluate how materials can be recovered from the existing buildings and hardstanding. A Site Waste Management Plan/Resource Management Plan shall be produced and implemented to minimise waste generation and to monitor waste arising. Minimisation measures – Services will be fully coordinated offsite prior to installation, to maximise efficiency and minimise waste. The Development has been set out to brick dimensions to minimise brick cutting and wastage. Window types have been kept to a minimum to minimise variation and waste caused by bespoke production. Use of prefabrication and reused materials, e.g. balconies and stair master systems, are being considered. For the community facilities, investigating the potential for gluelam structural elements with either SIPs or CLT infill wall panels where feasible.
Metrics	Waste generated; waste sent to landfill
Targets	London Plan Policy SI 7 targets – 95% diversion from landfill for demolition, construction, and excavation waste. Construction waste BREEAM WST01 target of ≤ 6.5 of waste generated per 100m² (gross internal floor area) to be applied site-wide.
Commitments & Measures	Review the feasibility and site practicalities of using off-site prefabricated/ manufactured components. Applying lean design principles and modular design where appropriate to minimise waste on site during construction. Maximise demolition waste recovery and reuse on-site where it is of suitable quality.
Implementation	The measures proposed in the above sections, as discussed during the workshop, shall be tracked, and included within tender packs to form contractual obligations for the main contractor and supply chain. Waste targets shall be closely monitored and recorded for inclusion within the post completion reporting stage.
Challenges / Counter-actions	A lack of understanding of existing materials and their practical applications at pre-planning impacts potential reuse opportunities and recovery. Material efficiency workshops to be scheduled during key stages to review commitments and ensure targets are being implemented.

Table 4 - Core Principle 3 commitments

Core Principle 3: Manage waste sustainably and at the highest value	
3.1 Manage demolition, excavation & construction waste	
Responsibility	Primary: *Client* Secondary: *Contractor & Supply Chain*
Timeframe	RIBA 5
Proposed Approach	Demolition waste - The strategy for the existing buildings on the Development is to deconstruct and recycle the materials. A pre-demolition audit will be conducted to fully identify the primary materials on the site and the potential options for reuse and recycling, both on-site and off-site. Rubble from the demolition to be used as a piling matt. Material acceptable provided it is sorted and graded prior to use. Use of recycled aggregate from demolition works for on-site applications can be explored for build ups under private roads or footpaths Opportunities for site claimed timber from tree felling to be explored for use in low balancing/play trails and for sculpture/art interventions Bricks from the demolition of the western boundary brick wall and the existing Maker Labs shall be reclaimed and re-used elsewhere on site. Excavation waste – Opportunities to use excavation waste on site will be reviewed. Cut and fill exercise to be carried out with excavated material used as fill where possible Re-use of topsoil and subsoil to be explored within soft landscape build ups. All are subject to testing for appropriateness and subject to potential remediation Construction waste – A Predicted Site Waste Management Plan shall be produced to minimise waste generation and to monitor waste arising. Waste will be segregated on site to maximise opportunities for re-use and recycling Material quantities to be well planned to minimise over ordering. Offcuts will be kept separate from other waste streams to be made available for reuse on or off-site, and materials only to be delivered to site when needed, to prevent damage Local waste processors will be identified that send minimum quantities of material to landfill.
Metrics	Waste generated; waste sent to landfill
Targets	London Plan Policy SI 7 targets – 95% diversion from landfill for demolition, construction, and excavation waste. Construction waste BREEAM WST01 target of ≤ 6.5 of waste generated per 100m² (gross internal floor area) to be applied site-wide.

Commitments & Measures	Pre-demolition audit to be conducted prior to start on site to quantify materials and maximise recovery. Forecast volumes for excavated material will be calculated and refined as part of the Development RIBA Stage 4 and 5. An integrated design approach will be refined to use excavated material to satisfy the fill material requirements wherever reasonably practicable. This includes reuse of all topsoil / subsoil as appropriate. Site Waste Management Plan to be implemented to minimise waste generation through appropriate techniques. Training staff in waste reduction techniques and proper segregation in order to ensure a cultural shift in attitudes towards waste.
Implementation	Incorporation of waste targets into the tender pack and specification clauses, to form part of contractual obligations for main contractor and supply chain. Implement monitoring and reporting procedures to ensure waste is being accurately and carefully recorded for post completion reporting purposes, and to identify areas where future improvements can be made.
Challenges / Counter-actions	Many contractors do not evaluate waste disposal further than the first-tier waste handler, the subsequent journey and final disposal or recycling site of waste is often unknown. Research required into local waste handling facilities and their onward disposal routes to understand opportunities for legal, transparent waste disposal.
3.2 Manage municipal waste	
Responsibility	Primary: *Client* Secondary: *Architect, Main Contractor*
Timeframe	RIBA 4-6
Proposed Approach	The Applicant shall provide refuse and waste storage in accordance with the London Borough of Richmond upon Thames requirements. Easily accessible communal waste storage shall be provided, with each residential core having its own waste and recycling stores on the ground floor. Waste storage shall be segregated by waste streams to maximise recycling rates. Bin stores shall be provided for houses to neatly accommodate all Local Authority recycling and waste containers to encourage recycling rates. The Applicant is committed to delivering a management framework, which shall be developed for waste management, energy monitoring, and water monitoring for the site in operation. This shall help deliver the 65% recycling of municipal waste by 2030 target.
Metrics	Recycling and refuse storage area (sqm) in line with Local Plan requirements

Targets	London Plan Policy SI 7 targets – at least 65% municipal waste to be reused, recycled, or composted by 2030 BREEAM WST03 targets for non-domestic element
Commitments & Measures	Waste storage to be provided in accordance with Local Plan requirements.
Implementation	Waste schedule shall be provided showing that the appropriate area (sqm) has been allowed for within the design. This shall be reflected in the refuse and waste storage drawings for residential and community elements.
Challenges / Counter-actions	Ensuring that occupants and building users within the Development participate in the waste segregation and recycling process could be difficult to enforce. By providing clearly segregated waste areas within refuse stores, this will help to facilitate appropriate sorting. An operational waste management plan, and occupant/building user guides will help inform occupants on procedures.

5. BILL OF MATERIALS

As part of the GLA guidance outlined in '*Circular Economy Statements (2022)*' guidance document, the Applicant should demonstrate that they have considered opportunities to conserve resources by applying lean design principles and to source materials sustainably.

Detailed Circular Economy Statements must include a completed Bill of Materials which estimates the quantity of materials used in each 'layer' of the building (kg), the material intensity (kg/m2 GIA) and set targets for the minimum amount of recycled content to be used (% by value). Applicants should identify opportunities for use of reused or recycled materials and set individual targets of at least 20 per cent by value of materials.

The purpose of reporting material intensity is twofold: first, to gather evidence about the material intensity of different structural systems and development types; and second, to ensure that material optimisation is considered as part of the design process.

The Bill of Materials table (the GLA 'Table 3' template; provided in Appendix 3) has been completed using building calculations provided by the design team and the cumulative results tabulated. The reported data are based on a best estimate and shall be reviewed as the detailed design develops.

6. RECYCLING AND WASTE REPORTING

In order to minimise waste streams sent to landfill, and in an effort to maximise diversion in line with the waste hierarchy, the GLA guidance outlined in '*Circular Economy Statements (2022)*' guidance document requires estimating and reporting the total amount of waste/ material generated during demolition, excavation, construction, and operation (in-use).

Detailed Circular Economy Statements must include a Recycling and Waste Reporting Form (the GLA 'Table 4' template; provided in Appendix 4) with clearly defined activities and targets relating to the following London Plan policy targets:

- 95% reuse/recycling/recovery of construction and demolition waste
- 95% beneficial use of excavation waste
- 65% recycling of municipal waste by 2030

7. END-OF-LIFE STRATEGY

The end of the life of the scheme has been considered from an early stage to ensure it can be simply deconstructed. The first priority is to ensure that buildings last beyond their design life. The proposed development is built out of a conventional reinforced concrete flat slab frame and brick external cladding, both of which are well established and robust materials. These materials, when properly maintained and looked after, can outlast the proposed design life of the Development. As such, at the end of its design life, the building would be suitable for refurbishment.

To aide this, there are a number of techniques that can be used to extend the life of key materials. It is likely over the lifetime of the Development further techniques will be developed to extend the life of the materials. Information on these techniques will be included in the O&M manual.

When dissembling the building, the key structural materials are all recyclable, re-useable or can be re-used on site as crushed aggregate for future developments. Guidance on disassembly and disposal of key materials shall be provided within the O&Ms.

The following sections detail principles which shall be implemented to facilitate material recovery at the end of life stage.

7.1 Durability

Durable materials shall be specified in all areas that are subject to high pedestrian movement, such as communal spaces. This will extend the lifespan of building materials, in particular those that are exposed, thereby reducing the need for replacement over the buildings' lifecycle.

7.2 Design for Disassembly

Components and products will be designed and selected to allow for disassembly and reuse at the end of their useful life. Building Information will be stored to facilitate end of life strategy, disassembly, future reuse, waste avoidance, and waste reduction. There shall be a

requirement for method statements on end of life from contractors and sub-contractors to be provided in the O&Ms - this shall form part of contractual obligations.

Disassembly is facilitated by principles allowing the building or parts of the building to be easily disassembled at the end of its life, or to be refurbished rather than demolished. The following measures shall be implemented to facilitate disassembly at end of life:

- Improve durability of materials where practicable in common areas
- Use reversible and/or mechanical connections where practicable, to facilitate disassembly and ensure materials can be recovered in a high value state
- Utilise layer independence where practicable (designing building systems and components in layers so that removal, adjustment, or replacement of some elements is feasible, especially when different components have different life spans and maintenance needs)
- Utilise standardised products and/or modular systems, including pre-fabricated elements as detailed in Section 4

7.3 Layer Independence

The Development has been designed with the RICS 'building layers' in mind, and where practicable building elements and components with different lifespans will form independent layers. This will ensure those layers with shorter lifespans can be replaced without causing damage to layers which have longer lifespans. This is expanded upon in Appendix 2.

7.4 Standardisation

Standard-size materials shall be used where practicable to accommodate and facilitate multiple uses, reuse and upgrading. Additionally, standard types of connections shall be specified, as these can be separated and reused more easily. A review of standardisation has been carried out and it is proposed to use standard M&E cupboards, standardised bathroom layouts, and prefabricated components such as precast stairs & ramps. Standardisation and modularity allow elements to be slotted together or taken apart to promote disassembly and flexible environments, as well as reducing construction waste. The feasibility of inclusion of modular elements will be fully evaluated post planning.

8. POST COMPLETION REPORTING

The Applicant is committed to providing a post completion report at RIBA 7 on the outcomes of the circular economy commitments in Section 4. The aim of this update will be to provide the predicted and actual performance against the metrics and targets stated within this detailed circular economy statement.

As a minimum the updated report shall cover the following:

- Circular Economy Strategic Approach – GLA Table 1
- Circular Economy Key Commitments – GLA Table 2
- Recycling and Waste Metrics – GLA Table 3
- Bill of Materials – GLA Table 4

The updated report shall be based on audits and as built information, highlighting differences between the designed and completed development, including a ‘lessons learned’ section.

9. CONCLUSION

This report summarises the Circular Economy strategy for the regeneration of Ham Close, in order to meet the sustainability requirements of the GLA London Plan Policy SI7 '*Reducing waste and supporting the Circular Economy'*, following the guidance outlined in '*Circular Economy Statements (2022)*' guidance document.

This circular economy strategy was developed in collaboration with the Design Team and Developer, following a virtual workshop held on 22nd September 2021. The workshop minutes are detailed in the Appendices. An overall strategic approach has been identified for both the existing buildings on the site and the proposed new development.

A number of key commitments and design strategies have been identified to ensure the Development will contribute towards a circular economy. These involve design decisions to minimise resources use, minimise waste and strategies to manage waste effectively. The Strategic Approach has been defined in Appendix 1, with core commitments described in Section 4, following the Circular Economy Core Principles. A summary of key commitments, an estimate Bill of Materials, and recycling and waste reporting targets are presented in the Appendices.

APPENDICES

APPENDIX 1: CIRCULAR ECONOMY STRATEGIC APPROACH

Table 5 - Circular Economy Strategic Approach - GLA 'Table 1'

ASPECT	PHASE / BUILDING / AREA	STEERING APPROACH	EXPLANATION	TARGET	SUPPORTING ANALYSIS / STUDIES / SURVEYS / AUDITS
Circular Economy approach for the existing site	All areas	*The existing site is not suitable for re-purposing, as such the existing buildings and hardstanding shall be demolished, and recovery of materials maximised in-line with GLA targets.* *The site is allocated in local plan for redevelopment. A suitable low-density site (192 units) has been selected to be redeveloped to provide 452 residential units, representing a high efficiency use of land and space.* *A demolition audit shall be required prior to start on site to ascertain quantities of materials and identify the most valuable end-use for wastes streams, to maximise opportunities for re-use and recycling of materials, for on-site and off-site applications.*	*Policy SI 7: "How all materials arising from demolition and remediation works will be re-used and/or recycled."* *BREEAM WST01 credits are targeted for the management and disposal of demolition and construction waste streams.*	*95% diversion from landfill* *Refer to BREEAM WST01*	Pre-demolition audit BREEAM Pre-Assessment
Circular Economy approach for the new development	Residential	*The residential section of the Development is not intended for regular change and as such will primarily be guided by the requirement for longevity. As such these sections of the Development will be designed to meet long term needs while being durable and resilient to a changing climate.* *The Applicant will facilitate the sustainable sourcing of materials, targeting the use of recycled material and content which can be re-used.* *As far as practicable, the Applicant shall look to maximise the use of recycled content within the Development where feasible. The use of pre-fabricated elements shall be prioritised, as these reduce construction waste, and include the use of precast floors and stairs.* *The Development utilises an efficient form factor for the geometry of the sites, maintaining an effective and efficient use of space.*	*Policy SI7 "Opportunities for managing as much waste as possible on site, and how much waste the proposal is expected to generate, and how and where the waste will be handled".* *BREEAM WST01 and WST03 credits are targeted for the management and disposal of demolition, construction, and operation waste streams.*	*95% diversion from landfill* *Refer to BREEAM WST01*	Hill Residential Sustainable Procurement Policy Site Waste Management Plan BREEAM Pre-Assessment
	Community Facilities	*The Community Centre and Maker Labs spaces are likely to undergo use changes intermittently, and as such will be guided by the requirement for adaptability. However, these are not likely to undergo changes as frequently as commercial spaces so are also guided by longevity.* *Massing optimisation studies have been undertaken to review and reduce the overall building form and massing, thus reducing material quantum.* *The BREEAM Pre-Assessment WST01 requires that the main contractor develop and implement a Site Waste Management Plan to quantify the amount of construction waste being generated by the Development and identify measures to reduce waste arisings.* *BREEAM MAT05 credit has been targeted requiring strategies for material robustness, durability, and adaptability, which encapsulates the commercial and residential areas of the Development.*	*Policy SI7 "How the proposal's design and construction will enable building materials, components, and products to be disassembled and re-used at the end of their useful life."* *BREEAM MAT01 life cycle impacts, and MAT05 designing for durability and resilience.*		
Circular Economy approach for municipal waste operation	Residential	*The Development will provide sufficient waste and recycling facilities in line with local authority guidelines. Each residential core has their own waste and recycling stores on the ground floor.*	*Policy SI7 "Adequate and easily accessible storage space to support recycling and re-use."* *BREEAM WST03*	*65% diversion from landfill*	Waste Management Strategy Building/Occupant user guides
	Community Facilities	*The Development will provide sufficient waste and recycling facilities in line with local authority guidelines. Commercial waste and recycling stores will be provided for the retail units.*			

APPENDIX 2: CIRCULAR ECONOMY KEY COMMITMENTS

Table 6 - Circular Economy Key Commitments - GLA 'Table 2'

	SITE	SUBSTRUCTURE	SUPER-STRUCTURE	SHELL/SKIN	SERVICES	SPACE/ STUFF	SUMMARY	POTENTIAL CHALLENGES	COUNTER-ACTIONS (WHO & WHEN)	PLAN TO PROVE AND QUANTIFY
SECTION A: CONSERVE RESOURCES										
Minimising the quantities of materials used	Whole Life-Cycle Carbon assessment and Circular Economy workshops have been undertaken. This includes the following measures:						The whole-life cycle carbon and circular economy workshops demonstrate that efficient design has allowed for the quantities of materials to be reduced. Additional opportunities will be reviewed as the design progresses.	Value engineering, site constraints and programming. Suitability of aggregate from demolition works. Supply chain and sustainable sourcing of materials hard to monitor.	Review of commitments to be conducted during the detailed design, including suitability of recycled aggregate and use of cement replacement in concrete specification	Meeting Minute notes to be produced. Update of the WLC and Circular Economy reports. Specification details and verification via as builts.
	The existing sites are not suitable for re-purposing, as such the existing buildings and hard standing shall be demolished, and recovery of materials maximised. This strategy minimises the use of any undeveloped land. Building form factor will be optimised where possible to increase efficiency and thus reduce the comparative thickness of insulation and overall area of facade required. Bricks from the demolition of the western boundary brick wall and the existing Maker Labs shall be reclaimed and re-used elsewhere on site The landscape design will seek to maximise the use of soft landscape where practicable to increase permeability and reduce	slab type, foundation type, façade construction has been considered within the WLC assessment to reduce embodied carbon and total building weight. This reduces the quantity of materials used in the construction process. Floor plates will be rationalised as much as possible to maximise material efficiency whilst achieving a balance between form factor and dual aspect provision. A review of opportunities to use recycled aggregates and GGBS in the substructure shall be reviewed as the design progresses. Optimising the slab thickness to balance concrete and reinforcement requirement where feasible. Apartment cores and communal stairs are of consistent design and layout across the scheme where possible. Basement designed so part of the temporary works structure, required to create a temporary watertight barrier to allow the phased construction of the basement, can be retained and used to provide permanent support to the completed structure	Curtain walling system fixed to the structural slabs and soffits. This can be removed and replaced in the event of a major refurbishment and are easily accessible from outside of the building using MEWP or similar relevant machinery	Minimising plant loading requirements through efficient design principles. Use of repetitive unit design. Stacking of the same flat types has been utilised wherever possible. This minimises the need to have horizontal pipework runs across the scheme.	Internal walls, non-structural to provide options for adaptability and refurbishment beyond the design life of the Development High efficiency interior and exterior LED lighting has been specified to reduce quantities and improve operational life span. Community Centre fit-out to client specification – minimises the use of speculative finishes. Massing optimisation studies have been undertaken to review and reduce the overall building form and massing, thus reducing material quantum				

	SITE	SUBSTRUCTURE	SUPER-STRUCTURE	SHELL/SKIN	SERVICES	SPACE/ STUFF	SUMMARY	POTENTIAL CHALLENGES	COUNTER-ACTIONS (WHO & WHEN)	PLAN TO PROVE AND QUANTIFY
Minimising the quantities of other resources used (energy, water, land)	extensive areas of hard surface The planting strategies will seek to reflect local environments or habitats where practicable. Both these and the tree planting strategy will include consideration for native species	As above for general resource use.		Highly efficient building fabric to reduce energy demand in line with GLA and LBRuT targets. The Energy Strategy demonstrates that the proposed strategy offers a betterment over the 10% residential and 15% non-residential carbon emission reduction target for Be Lean design proposals alone.	The proposed strategy is to implement a site-wide communal heat network with the heating and hot water demand supplied by high efficiency heat pumps. Dynamic overheating assessment carried out, reducing the requirement for cooling plant.	Provision of energy and water meters to each tenant to facilitate monitoring in-use. Opportunities for reducing energy and water consumption will be promoted to tenants through home user guides.	An efficient building design will ensure that energy consumption and carbon emissions are minimised. A detailed strategy has been developed to ensure that energy consumption is minimised.		Any variations from the original energy strategy should be checked to ensure the Development still complies with its energy targets	As built SAPs and EPCs.
Specifying and sourcing materials responsibly and sustainably	The Applicant shall endeavour to responsibly source local materials where this is practicable and feasible within the supply chain. This includes the use of products with Environmental Declaration Certificates where possible. A review of opportunities to use recycled aggregates and GGBS in the substructure shall be reviewed as the design progresses. Locally sourced concreted and aggregates will be sought, pending availability and feasibility within the supply chain. BREEAM Life Cycle Impacts assessment to be completed, with Green Guide ratings of A+ or A targeted for majority of major building elements. EPD certificates provided for major building elements – refer to Whole Life-Cycle Carbon Assessment. For the community centre facilities, investigating the use of timber structural components and timber internal finishes where feasible. The proposed window systems will potentially be a composite system incorporating aluminium and timber finishes. Proposing large format architectural masonry blocks with a recycled content of over 30% for the external envelope – these will also require less mortar joints compared to traditional sized brickwork i.e. meaning less cement is used in the envelope make-up.						The site shall endeavour to source materials with low embodied carbon and from a sustainable supply chain.		Design Team to review commitments and identify recycled content requirements of key materials.	The contractor will be required to provide evidence that key materials meet the required specification and complete the Bill of Materials Reporting table
SECTION B: DESIGN TO ELIMINATE WASTE (AND FOR EASE OF MAINTENANCE)										
Designing for reusability / recoverability / longevity / adaptability / flexibility	The existing site is not suitable for re-purposing, as such the existing buildings and hard standing shall be demolished, and recovery of materials maximised. This strategy minimises the use of any undeveloped land A resource management plan will be developed to monitor and record waste arisings, and help to	Use of a reinforced concrete frame which will last for at least the design life of the Development and can be extended with sufficient maintenance. Lightweight partitioning within apartments means no load bearing partitions will be provided, which maximises internal remodelling for adaptability for future tenants.		External brick cladding and clay tile hanging will be used which will have a lifespan beyond the design life of the Development. The external skin will be predominantly brick, which is a natural, durable, and reusable material	A dynamic overheating assessment has been completed to reduce overheating of the building using future climate scenarios. High efficiency interior and exterior LED lighting has been specified to reduce quantities and improve operational life span. MEP services and energy centre designed for ease of access and for ease of replacement in the future, with direct access to the Energy Centre from the exterior of the building with large doors to enable easy replacement of MEP equipment. Future connection to local DHN when available - plant switch-over maximised and allocated pipework routes to minimise disruption.		Design for longevity with robust materials and systems that are capable of handling any change	Value engineering, site constraints and programming.	All materials and systems should be designed for longevity. All commitments will be reviewed at the detailed design stage	Meeting Minute notes to be produced. Update of the WLC and Circular Economy reports. Specification details and verification via as builts.

	SITE	SUBSTRUCTURE	SUPER-STRUCTURE	SHELL/SKIN	SERVICES	SPACE/ STUFF	SUMMARY	POTENTIAL CHALLENGES	COUNTER-ACTIONS (WHO & WHEN)	PLAN TO PROVE AND QUANTIFY
Designing out construction, demolition, excavation, industrial and municipal waste arising	establish targets in line with GLA guidance i.e., 95% diversion from landfill for construction, demolition, and excavation waste, and 65% municipal waste	As a concrete structure, it will be difficult to design for disassembly, however it is proposed to maximise the use of pre-fabricated components, such as balconies and stairs. A review of opportunities to use recycled aggregates and GGBS in the substructure shall be reviewed as the design progresses.		The Development's building envelope has been set out to brick dimensions, along with all openings, i.e., external doors and windows on the envelope, to minimise brick cutting and wastage.	Services have been fully coordinated during design phase. Standardised typical M&E Cupboard has been provided to all residential units. There are standardised bathroom/en-suite layouts which have been developed for the scheme. Use of repetitive unit design. Stacking of the same flat types has been utilised wherever possible. This minimises the need to have horizontal pipework runs across the scheme.		Maximising design efficiency to effectively design to waste through careful coordination of services	Value engineering, site constraints and programming.	Sufficient lead time will be provided to allow a fully co-ordinated design to take place.	
SECTION C: MANAGE WASTE										
Demolition waste (how waste from demolition of the layers will be managed)	A pre-demolition audit will be conducted to quantify re-useable materials and to evaluate how materials can be effectively recovered for use on-site and off-site. Rubble from the demolition to be used as a piling matt. Material acceptable provided it is sorted and graded prior to use. Use of recycled aggregate from demolition works for on-site applications can be explored for build ups under private roads or footpaths Opportunities for site claimed timber from tree felling to be explored for use in low balancing/play trails and for sculpture/art interventions Local waste processors will be identified that send minimum quantities of material to landfill						Pre-demolition audit will quantify suitable materials on site for reuse and recycling. Excavation will be minimised through cut and fill. Develop a resource management plan for the site. Waste storage to satisfy LPA requirements.	Value engineering, site constraints and programming. Suitability of aggregate from demolition works. Possibility of contamination of excavation waste.	A pre-demolition audit will be conducted to quantify re-useable materials and to evaluate how materials can be effectively recovered for use on-site and off-site	Meeting Minute notes to be produced. Update of the WLC and Circular Economy reports. Specification details and verification via as builts.
Excavation waste (how waste from excavation will be managed)	Opportunities to use excavation waste on site will be reviewed. Cut and fill exercise to be carried out with excavated material used as fill where possible Re-use of topsoil and subsoil to be explored within soft landscape build ups. All are subject to testing for appropriateness and subject to potential remediation. Cut and fill for soil volume to be used to avoid bringing in or removing excessive material to and from site – subject to suitability.									
Construction waste (how waste arising from construction of the layers will be reused or recycled)	The Applicant will adopt a Resource/Site Waste Management Plan to minimise waste arisings Material quantities to be well planned to minimise over ordering. Offcuts will be kept separate from other waste streams to be made available for reuse on or off-site, and materials only to be delivered to site when needed, to prevent damage Local waste processors will be identified that send minimum quantities of material to landfill Waste will be segregated on site to maximise opportunities for re-use and recycling									
Municipal and industrial waste	Easily accessible communal waste storage to be provided, with each residential core having its own waste and recycling stores on the ground floor. Waste storage to be segregated for waste streams to maximise recycling rates. Provision of waste storage to satisfy Local Authority requirements.									

APPENDIX 3: BILL OF MATERIALS

Table 7 - Estimate Bill of Materials

LAYER	ELEMENT	MATERIAL QUANITY (kg)	MATERIAL INTENSITY (kg/m2 GIA)	RECYCLED CONTENT (% by value)	REUSED CONTENT (% by value)	ESTIMATED REUSABLE MATERIALS (kg/m2)	ESTIMATED RECYCLABLE MATERIALS (kg/m2)	SOURCE OF INFORMATION
Structure	*Substructure*	82,132,704	1,925	*Min. 20% ambition*				Calculations taken from the Whole Life-Cycle Carbon Assessment. Data from OneClick LCA circularity tool, and associated GLA WLC assessment reporting template spreadsheet.
	Frame	3,863,000	91	*Min. 20% ambition*				
	Upper Floors	30,060,923	705	*Min. 20% ambition*				
	Roof	9,173,453	215	*Min. 20% ambition*				
	Stairs and Ramps	1,258,370	30	*Min. 20% ambition*				
Shell/Skin	*External Walls*	7,910,310	185	*Min. 20% ambition*				
	External Windows and External Doors	401,549	9	*Min. 20% ambition*				
Space	*Internal Walls and Partitions*	6,275,404	147	*Min. 20% ambition*				
	Internal Doors	52,799	1	*Min. 20% ambition*				
	Finishes	258,540	6	*Min. 20% ambition*				
	Services (MEP)	307,798	7	*Min. 20% ambition*				
	External Works	7,593,662	178	*Min. 20% ambition*				
Other	*Unclassified*	13,388,100	314	*Min. 20% ambition*				

APPENDIX 4: RECYCLING AND WASTE REPORTING

Table 8 - Recycling and Waste Reporting

CATEGORY	TOTAL ESTIMATE	OF WHICH…				SOURCE OF INFORMATION
	t/m2 Gross Internal Area (GIA)	% of reused or recycled onsite	% reused of recycled offsite	% not reused or recycled (max. 5%)		
				% to landfill	% to other management (e.g., incineration)	
Excavation Waste	High level earthwork excavation quantities have been provided to better understand the volume of excavation material expected. The Applicant estimates 49,248 m^3 of excavation waste. The Applicant is committed to a 95% diversion from landfill for all non-hazardous excavation waste arisings.			≤5% To be confirmed by soil analysis and cut & fill calculation		Earthwork Calculation (Appendix 7) Policy SI 7 commitment
Demolition Waste	An independent pre-demolition audit has been conducted prior to start on site in order to quantify volume of materials and waste generation expected. The independent demolition audit report estimates 18,728.88 tonnes waste (0.57t/m^2 GIA). This is broken down into material types and quantities, highlighting potential recovery of materials, for reuse or recycling. It is expected that a 98% diversion from landfill target can be achieved with careful segregation techniques. The Applicant is committed to a 95% diversion from landfill for demolition waste arisings.			≤5% Pre-demolition audit targeting 98% diversion from landfill.		BREEAM WST01 commitment Policy SI 7 commitment Pre-demolition Audit (Appendix 6)
Construction Waste	Resource Management Plan to be developed as the design progresses, in order to maximise opportunities for reusing and recycling construction waste. Non-hazardous waste materials from on-site construction and dedicated offsite manufacture or fabrication shall be included. The Applicant sets a target of ≤ 6.5 of waste generated per 100m^2 (gross internal floor area). The Applicant is committed to a 95% diversion from landfill for all non-hazardous construction waste arisings.			≤5% To be confirmed by Resource Management Plan		BREEAM WST01 commitment Policy SI 7 commitment
	t/annum	% reused on or off site	% recycled or composted on or off site	% not reused or recycled		
				% to landfill	% to other management (e.g. incineration)	
Municipal Waste	Municipal Waste management Strategy to be developed. It is estimated that there will be approximately 392 kg/person generated annually, which amounts to 498 tonnes for the whole site (assuming full residential occupancy), based on data from DEFRA *'Statistics on waste managed by local authorities in England in 2019/20'.* Targeted 65% recycled or composted on or off site by 2030.			*Max. 35% and no recyclable or compostable waste*		Local Authority storage requirements Policy SI 7 commitment

APPENDIX 5: CIRCULAR ECONOMY WORKSHOP MINUTES

Ham Close Regeneration

CIRCULAR ECONOMY WORKSHOP MEETING

Date:	22nd September 2021		
Location:	Online meeting (MS Teams)		
Attendees:	Kirsty Dougan	-	Hill Residential
	Nick Silk	-	Hill Residential
	Teo Lall	-	Hill Residential
	Joe Boyton	-	Hill Residential
	Jonathan Burnham	-	BPTW
	Jo Peycheva	-	WR-AP
	Jeremy Lord	-	LUC
	Mark Fisher	-	LUC
	Tony Miller	-	Jubb
	Bomi Ogunade	-	AWA Building Services
	Juliano Mandinga	-	Energist UK
	James Alexander	-	Energist UK
Distribution:	As above		

	Item	Action
1.0	**Introduction to Circular Economy**	
1.1	JA introduced the concept of the circular economy and provided the GLA definition and how it can be considered within the built environment and to resolve issues surrounding a linear economy. The core guiding principles of the circular economy were explained and how these relate to the built environment on a 'building layer' basis.	
2.0	**Targets**	
2.1	Targets for the site were discussed and comparison drawn to BREEAM credits for adaptation studies and waste management. It was noted that this is a regeneration development, with demolition required for existing buildings and hardstanding.	

	A demolition audit shall be required prior to start on site to ascertain quantities of materials and identify the most valuable end-use for wastes streams.	**Hill**
2.2	JA confirmed that the GLA circular economy targets are for a 95% diversion from landfill for demolition, construction, and excavation waste, as well as a 65% target for operational municipal waste.	
2.3	It was discussed that the GLA have a target for a minimum of 20% recycled or reused materials for each building element. Applicants can either report against targets for different building layers (for example, structure, shell/skin and space) or for different materials (for example, metals, plastic, timber). If reporting by material, calculations should focus on those with the highest value and aim to address at least 80% of the material used (i.e. 80% by value). If reporting by building layer, applicants should focus on the 'structure', 'shell/skin' and 'space' as a minimum.	

3.0 Strategic Approach

3.1	With reference to the GLA decision tree, it was discussed that the strategic approach for the site was to redevelop the existing site as the existing buildings and sites are underutilised and not fit for repurposing. The strategy for the building design shall thereafter be to maximise flexibility, adaptability, and longevity principles for the respective building layers.	
3.2	A review of the design strategies and design features currently incorporated into the design and potential changes were reviewed against the GLA Circular Economy 'Core Principles'. A number of key commitments and design strategies were identified to ensure the Development will contribute towards a circular economy. These involve design decisions to minimise resources use, minimise waste and strategies to manage waste effectively. Draft commitments to be issued to the team for further review and assessment of the impacts on the circular economy and designing to eliminate waste.	**All**
3.3	As the design develops, an estimate of material quantities shall be provided by Design Team in order to complete the GLA Table 3 template for estimated bill of materials, as part of the Detailed Circular Economy Statement. These data will be as provided for the WLC assessment.	**All**
3.4	A disassembly and end-of-life strategy will need to be developed for major building elements, to facilitate recovery of materials and maintain them at their highest value for as long as possible. This shall be required for the Detailed Circular Economy Statement.	**All**

APPENDIX 6: DEMOLITION AUDIT

Provided Separately

APPENDIX 7: EXCAVATION CALCULATIONS

Provided Separately

APPENDIX 8: REFUSE STRATEGY

Provided Separately

APPENDIX 9: DESTINATION LANDFILLS

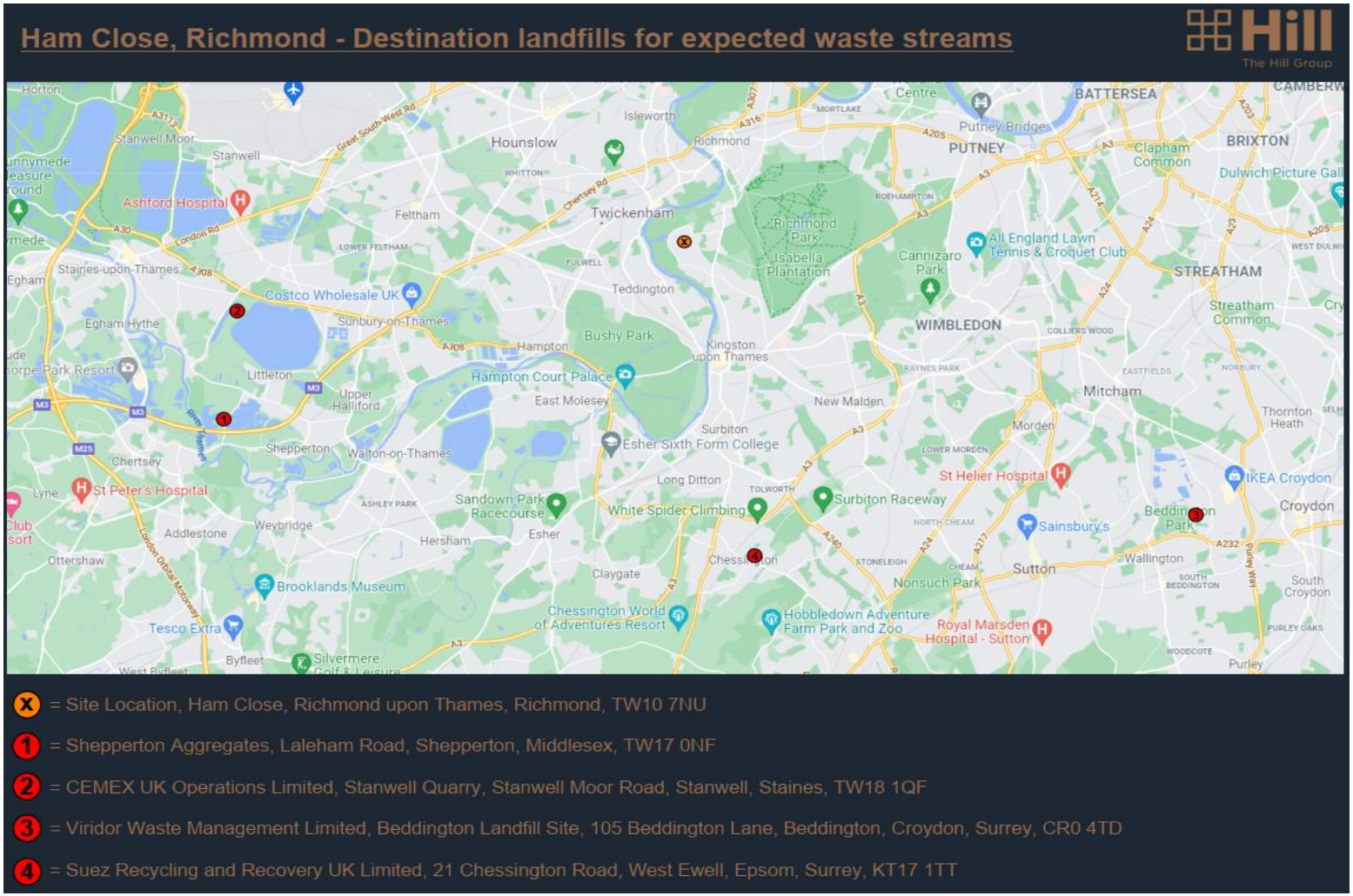

Figure 5 - Identified waste handlers for the regeneration of Ham Close