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Manor Road, Richmond
Circular Economy Statement

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Confidentiality and Third Party Responsibility

Revision Table

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Executive Summary

This Circular Economy Statement has been prepared by chapmanbdsp on behalf of Avanton Richmond Development Ltd ('the Applicant') in support of an application for full planning permission for the proposed redevelopment of the Homebase store at 84 Manor Road, North Sheen ("the Site") within the London Borough of Richmond Upon Thames (LBRuT).

The site is located in the administrative area of the London Borough of Richmond upon Thames approximately 1.1km south of Kew Gardens and approximately 1.6km north of Richmond Park. The Thames is approximately 1.5km to the west.

The Proposed Development consists of the demolition of existing buildings and structures and comprehensive residential-led development to provide 453 residential units (of which 173 units will be affordable), flexible retail, community and office uses, provision of car and cycle parking, landscaping, public and private open spaces and all other necessary enabling works ('the Proposed Development').

A Circular Economy Statement has been produced due to the importance of sustainability in the consideration of design quality, this statement is provided to demonstrate how the proposals perform against the criteria set out in London Plan Policy SI7 and guidance published in March 2022.

The approach to circularity for the proposed scheme is guided by the London Plan Guidance (2022) including circular economy principles, building in layers framework and circular economy design approaches.

The following circular economy parameters have been targeted:

- Demolition waste materials (non-hazardous) from hard landscaping:

Minimum of 95% diverted from landfill for reuse, recycling or recovery

- Excavation waste materials if they are suitable to be diverted from landfill according to the contaminated land expertise:

Minimum of 95% diverted from landfill for beneficial reuse

- Construction waste materials:

Minimum of 95% diverted from landfill for reuse, recycling or recovery

- Municipal waste:

Minimum 65% recycling rate by 2030

- Recycled or reused content by value:

Minimum 20% of the building material elements to be comprised of recycled content by value

- Buildings and materials circularity model (One Click LCA tool):

The circularity score is 33% involving recycled materials to be implemented in the project and recycling/downcycling of materials at the end of life

Figure 0.1: Aerial view of the scheme

1 Introduction

The objective of this report is to summarise the circular economy principles considered in the design of the scheme, and the material and waste targets to be achieved at the practical completion of the project. This report relied on outputs from Whole Life Carbon assessment, Sustainability Statement, BREEAM pre-assessment categories Material & Waste, Sustainable Procurement Plan, Site Waste Management Plan and Operational Waste Management Strategy.

The following circular economy principles have been explored.

- Lean design principles (low energy demand, light weight construction)
- Facilitate future adaptability and flexibility
- Structural and fabric resilience (resilient design)
- Design for longevity, reusability, and recoverability
- Disassembly and demountability
- Reduce materials & resources usage (retaining, reusing, recycling, repurposing)
- Reduce & manage construction waste (minimising energy and water use during construction and operation)
- Re-use of materials on-site (demolition materials)
- Use materials with high recycled content
- Low embodied carbon materials (compliant EPDs)
- Sustainable sourcing of materials (FSC or PEFC certified timber, suppliers who operate a compliant environmental management system)
- Use materials efficiently
- Thinking in layers and how each building layer can be designed for material efficiency
- Promote local and sustainable sourcing
- Where possible use alternative construction techniques such as Design for Manufacture and Assembly (DfNA) and offsite modular construction

The following key stakeholders were engaged through workshops and meetings from the very outset of the project to consider design interventions in line with the approach. Client, Project Manager, Planning Consultant, Quantity Surveyor, Architect, Structural engineer, Façade consultants, Building Services engineers, Sustainability and other consultants contributed in shaping the circular economy targets incorporated in the design of the project.

1.1 Existing site details

The site (about 1.5ha) is located to the south of A316 arterial Lower Mortlake Road and is shaped by the railway lines and by Manor Road on each of its 3 sides. Only one side of the site has street frontage, along Manor Road. It is currently occupied by a Homebase store and associated surface level car parking. There is a functional bus depot on the northern section of the site which will remain as part of the design proposal.

1.2 Description of proposed development

Avanton Richmond Development Ltd are submitting applications for full planning permission to enable the proposed redevelopment of the Homebase store at 84 Manor Road, North Sheen ("the Site"). The proposed development includes demolition of existing buildings and structures and construction of a mixed-use development comprising 453 residential units, flexible retail, community and office uses, provision of car and cycle parking, landscaping, public and private open spaces and all other necessary enabling works.

The project adopted the six principles of circular economy from the London Plan 2021 including developing bespoke building/materials' circularity, waste hierarchy and sustainable sourcing of materials in line with the following London Plan Guidance for Circular Economy:

- Policy D3: optimising site capacity through the design-led approach
- Policy SI7: reducing waste and supporting the circular economy
- Policy SI2: minimising greenhouse gas emissions.

Use Type	Proposed GEA sqm
Residential (C3)	37,248
Flexible Commercial Uses (A1, A2, A3, D2 & B1)	495
Ancillary, Plant & Bike Stores	1,779
Total	**39,522**

Table 1.1 – Use classes and areas.

Figure 1-1 - Location plan of the proposed development site.

1.3 Circular Economy Aspirations

The client is committed to optimise material use, to minimise upfront embodied carbon to the limits set out by the Greater London Authority (GLA) as well as minimising construction waste and diverting at least 95% of the demolition and construction waste from landfill.

The strategic approach was discussed at workshops which set the key targets and required actions for achieving those targets in practice. These discussions were followed up by one-to-one discussions. The outputs of these discussions are included in Tables 3.1 and 3.2, in Section 3.1 and 3.2 of this report.

The Client's aspirations are to deliver a good benchmark from both an embodied and operational carbon perspective, considering that the environmental impact is kept to the minimum. Furthermore, the scheme aims to incorporate a number of sustainable solutions to enable it's uses to make environmentally conscious decisions throughout the operational life of the proposed development.

The following strategy has been proposed in agreement with the key stakeholders for the project:

- The sustainability framework used on this project focus on 5 key factors; the people, the building, the social network, the natural environment, and the economic aspects to capture the multi-faceted sustainability benefits and values that the development seeks to bring to the application site; local community; surrounding businesses and future building users. Circular economy aspects are captured within both natural and physical capital.
- The delivery plan of this strategy will be monitored at all stages of the project ensuring that all elements of the strategy and set timeframes for the different activities and milestones are all on track.
- A pre-demolition audit has been undertaken for the project to establish which elements of the existing structures can be re-used, reclaimed or recycled.
- Waste Management during demolition and construction will be undertaken in accordance with the Construction and Environment Management Plan prepared by Avison Young and will follow the waste hierarchy guidance for prevention, reuse, recycle, recover and dispose. Based on the waste forecast, the Site scheme will meet the targets outlined in the London Plan and Richmond Council.
- Sustainable Procurement Plan has been prepared setting out objectives and targets for local and sustainable procurement where possible.
- The non-domestic element (retail) of the project is being assessed under the applicable BREEAM certification.
- The aspiration is to divert in excess of 95% (by tonnage) of the non-hazardous waste from going into the landfill.
- With regards to contributing towards circularity the recycled content within the construction elements will be maximised as much as possible. The table below indicates the recommended values.
- Modern methods of construction such as design for manufacture and assembly (DfMA) and offsite modular construction opportunities will be considered during detailed design stages to further optimise the material use and reduce construction waste.
- Sustainability certification is being pursued, in the form of BREEAM assessment for the retail elements of the site. A BREEAM pre-assessment exercise has been undertaken via workshops in conjunction with the project team.
- It is expected that with the proposed construction around 95% of the building materials can be recycled/downcycled at the end of life according to the One Click LCA GLA Building circularity model, around 84% of which can be downcycled and around 9.8% recycled.
- Robust data collection plans will be implemented through design and construction to facilitate ongoing monitoring against intended outcomes.
- Given the scale of the development and the likely nature of the construction programme over a few years, it is expected that the strategies and approach will evolve over time.

2 Methodology

A holistic approach has been adopted to reach the targets for the project. The focus has been to create an architectural design where the circular economy principles could be embedded in the design rather than an afterthought. Having a clear understanding of the objective of the London Plan policies SI2 and SI7, the concepts of whole life carbon and circular economy were considered comprehensively.

The design approach follows the following framework (London Plan Guidance, 2022):

- building in layers – ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
- designing out waste – ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials
- designing for longevity
- designing for adaptability or flexibility
- designing for disassembly
- using systems, elements or materials that can be reused and recycled.

The principles support the application of the waste hierarchy in that avoiding or reducing waste is prioritised (Guidance on applying the waste hierarchy, Defra, 2011):

- Prevention: Using less material in design and manufacture. Keeping products for longer; re use. Using less hazardous materials.
- Preparing for re-use: Checking, cleaning, repairing, refurbishing, whole items or spare parts.
- Recycling: Turning waste into a new substance or product. Includes composting if it meets quality protocols.
- Other recovery: Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling.
- Disposal: Landfill and incineration without energy recovery.

The integral team is supportive of the transition from a linear approach to a circular one, led by the GLA's core principles. Circular economy principles in conjunction with the whole life carbon approach incorporated on the design of the project will deliver the client's wider sustainability credentials.

Discussions were held with the key stakeholders for establishing an integrated approach tailored for the project. This included a Whole Life Carbon and Circular Economy workshops and meetings, attended by the architect, structural engineer, building service engineer, façade consultant and project manager. Additional workshops are to be undertaken at the detailed design stages with the team and the main contractor.

A holistic approach has been adopted to establish the approach and targets for the project. The focus has been to create an architecture where the circular economy principles could be embedded in the design rather than afterthought. Having a clear understanding of the objectives of the London Plan policies SI2 and SI7, the concepts of whole life carbon and circular economy were considered comprehensively. The design approach follows the following framework:

Retain - Consider retaining the existing structure
Reuse - Consider reuse
Recycle - For construction, use recycled and recyclable materials as much as possible.

Discussions were held with the key stakeholders for establishing an integrated approach tailored for the project. This included a Whole Life Carbon and Circular economy workshop during the design stage.
Additional workshops are to be undertaken at the detailed design stages with the team and the main contractor. This report and the targets set as a part of this process will be re-addressed at further stages of the project to verify that the targets are delivered at the practical completion of the project.

3 Planning policy context

The following adopted and emerging sustainability policies and documents have been considered within the context of the proposed development, to identify the target compliance with relevant requirements and to inform viable circular economy opportunities:

- National Planning Policy Framework (2021)
- GLA The London Plan (March 2021)
- GLA Circular Economy Statement LPG (March 2022)
- London Borough Richmond upon Thames Local Plan (July 2018)
- LBRuT Climate Emergency Strategy (2020-2024)

3.1 National Planning Policy Framework (2021)

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England, and how these are expected to be applied. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations. The NPPF highlights that 'the purpose of the planning system is to contribute to the achievement of sustainable development' and that 'plans and decisions should apply a presumption in favour of sustainable development.' This scheme has been developed in line with the NPPF.

3.2 The London Plan (2021)

The London Plan, a spatial development strategy for Greater London includes objectives to reduce the capital's impact on, and exposure to, the effect of climate change. The most relevant policies for this Adaptive Design Strategy are:

Policy D 3: Optimising site capacity through design-led approach

Aim for high sustainability standards (with reference to the policies within London Plan Chapters 8 and 9) and take into account the principles of the circular economy.

Policy SI 2: Minimising greenhouse gas emissions

Operational carbon emissions will make up a declining proportion of a development's whole life-cycle carbon emissions as operational carbon targets become more stringent. To fully capture a development's carbon impact, a whole life-cycle approach is needed to capture its unregulated emissions (i.e. those associated with cooking and small appliances), its embodied emissions (i.e. those associated with raw material extraction, manufacture and transport of building materials and construction) and emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal).

F. Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Policy SI 7: Reducing waste and supporting the circular economy

A. Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal would 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% by 2030
5) meet or exceed the targets for each of the following waste and material streams:
    a) construction and demolition – 95% reuse/recycling/recovery
    b) excavation – 95% 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.

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

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

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

Policy SI 8 Waste capacity and net-waste self sufficiency

This policy sets out the need to manage London's waste sustainability, with the target to achieve net self-sufficiency by 2026.

3.3 GLA Circular Economy Statements LPG (2022)

This guidance explains how to prepare a Circular Economy (CE) statement to comply with Policy SI 7, including the information that must be submitted under Policy SI 7(B). It also includes guidance on how the design of new buildings, and prioritising the reuse and retrofit of existing structures, can promote CE outcomes. Further, London Plan Policy D3 requires all development to aim for high sustainability standards, and to take into account the principles of the circular economy.

This guidance sets out how CE principles, the concept of building in layers and appropriate design approaches should inform referable applications.

3.4 GLA Whole Life-cycle Carbon Assessments LPG (2022)

This guidance explains how to prepare a Whole Life-Cycle Carbon (WLC) assessment in line with Policy SI 2 F of the London Plan 2021 using the WLC assessment template.

This guidance explains how to calculate WLC emissions and the information that needs to be submitted to comply with the policy. It also includes information on design principles and WLC benchmarks to aid planning applicants in designing buildings that have low operational carbon and low embodied carbon.

3.5 London Borough Richmond upon Thames Local Plan (July 2018)

LBRuT's Local Plan was adopted in July 2018. The Local Plan replaces (2018) replaces the previous Local Plan as well as the Local Development Management policies. Key policies relating to Whole Life Carbon are summarised below.

Policy LP 20 Climate change adaption

The Council will promote and encourage development to be fully resilient to the future impacts of climate change in order to minimise vulnerability of people and property.

New development, in their layout, design, construction, materials, landscaping and operation, should minimise the effects of overheating as well as minimise energy consumption.

Opportunities to adapt existing buildings, places and spaces to the likely effects of climate change should be maximised and will be supported.

Policy LP 22 Sustainable design and construction

Developments will be required to achieve the highest standards of sustainable design and construction to mitigate the likely effects of climate change.

Developers are required to incorporate measures to improve energy conservation and efficiency as well as contributions to renewable and low carbon energy generation.

The Council requires developments to contribute towards the Mayor of London target of 25% of heat and power to be generated through localised decentralised energy (DE) systems by 2025.

Policy LP 24 Waste management

The Council will ensure that waste is managed in accordance with the waste hierarchy, which is to reduce, reuse or recycle waste as close as possible to where it is produced.

- Development proposals, where appropriate, should make use of the rail and the waterway network for the transportation of construction, demolition and other waste. Development proposals in close proximity to the river should utilise the river for the transport of construction materials and waste where practicable.

3.6 LBRuT Climate Emergency Strategy (2020-2024)

Richmond Council proclaimed a climate emergency in July 2019 and committed to strive towards become carbon-neutral by 2030. In order for the council and Richmond as a whole to play its part in resolving the climate emergency, the Richmond Climate Emergency Strategy (RCES) and Action Plan developed and identified six key areas that must be addressed to meet legislative requirements as wells as contributing to reducing carbon emission:

a) Our council: Becoming Carbon Neutral as an Organisation by 2030
b) Our legacy: Climate Change Mitigation and Energy Efficiency
c) Our waste: Waste and Plastics and the Circular Economy
d) Our air: Improving Air Quality
e) Our nature: Green Infrastructure and Biodiversity
f) Our resilience: Climate Resilience and Flooding

4 Circular Economy Design Approach

4.1 Existing Site Opportunities

The existing site contains a Homebase store and hardstanding landscaping. A pre-demolition audit assessment (Appendix 11.2) was conducted by Salter demolition for the existing site to gauge what, if any, elements of the existing structures and hard landscaping can be retained, reused, reclaimed or recycled.

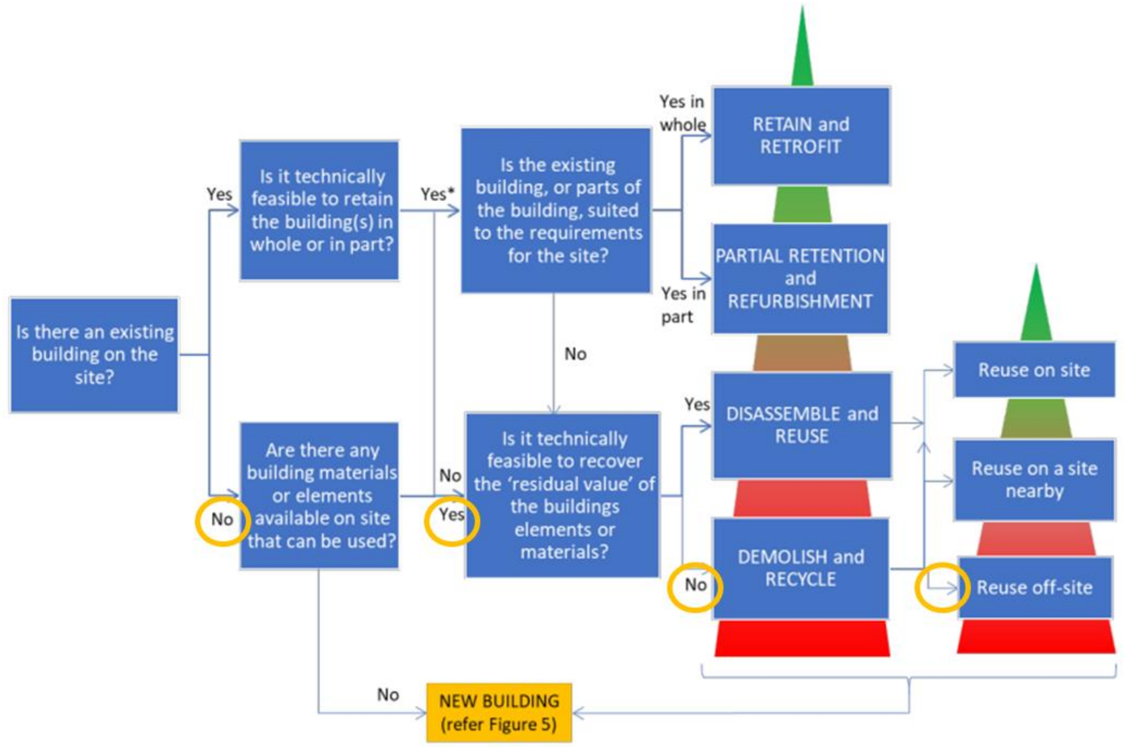

Figure 3-1 – Decision tree for design approaches for existing structures/buildings.

It was not deemed feasible or desirable to retain the existing building. By constructing a new development, the energy and operational efficiency of the building can be optimised without the fabric constraints of an existing building. A pre-demolition audit has been undertaken to investigate how recycling of construction, demolition and excavation material can be maximised. This has highlighted specific elements of the existing building and hardstanding landscaping on the site which can be re-used or recycled/recovered, as follows in Table 4.1.

Circular Economy Design Approach	Phase / Building / Area / Layer	Strategic Response
Refurbish	Whole Building	It was not deemed feasible or desirable to refurbish the existing building. All existing elements will be demolished.
Repurpose	Site	The existing site is to be repurposed to provide a mixed-use development comprising 453 residential units, flexible retail, community and office uses, provision of car and cycle parking, landscaping, public and private open spaces and all other necessary enabling works.
Disassemble / Deconstruct and Reuse	Superstructure & Equipment	• Some of the existing equipment such as racking and shelving can be sold and reused. • Some ferrous and non-ferrous metal, suitable for reuse can be sold and reused. • The ground floor concrete slab and foundations are constructed of RC concrete which will all be demolished and crushed to a 6F2 specification for reuse on site. A pre-demolition audit has been completed to explore all options.
Demolish / Deconstruct and Recycle	Whole building	• Steelwork frame – potential for recycling as is or processed for reuse. • The ground floor concrete slab and foundations are constructed of RC concrete, all will be demolished and crushed to a 6F2 specification for reuse within the site. • Clean concrete will be processed back to aggregate for concrete construction. • Other ferrous and non-ferrous metals, not suitable for reuse will be processed into new products. • Plasterboard is separated into its powder and paper elements, the powder is processed for use in new plasterboard and new cement and the paper element is used for new paper and animal bedding. • Insulation can be limited in its recoverability due to potential contamination. Where possible, insulation will be recovered at the recycling facility for reprocessing. • Tarmac, in some instances, can be recycled for reuse. However, tar bound product cannot be recycled and has to be disposed of as a waste product. Pre-demolition audit has been completed to understand how each material can be maintained at the highest value.

Table 4.1 – Circular economy design approaches for existing structures/buildings.

4.2 New Development

4.2.1 Building in Layers

The new development is designed to a life cycle exceeding 60 years, targeting a lifespan of 100+ years. Therefore, the circular economy design approach for the new development has been developed by building layer, as shown below.

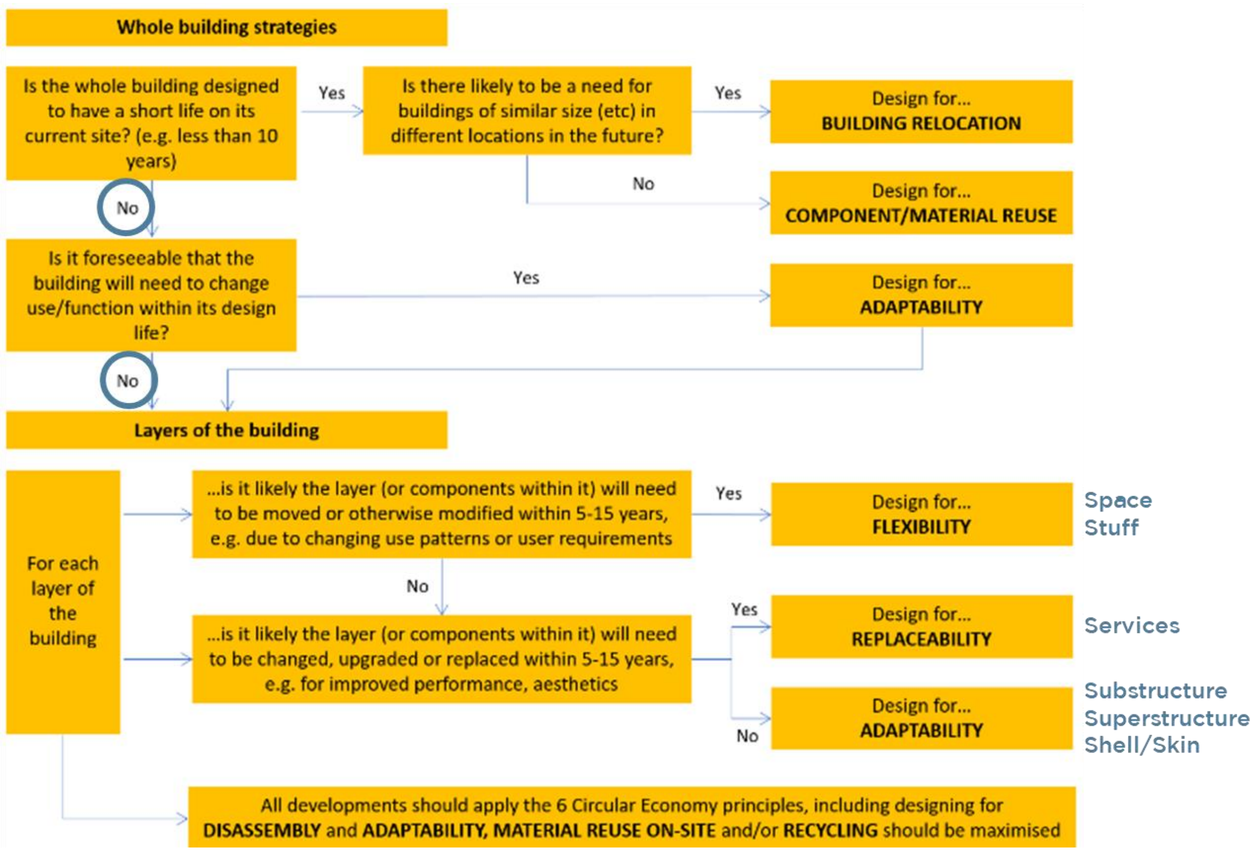

Figure 4-2 – Decision tree for design approaches for new buildings, infrastructure, and layers over the lifetime

The proposed scheme design has been broken down into building layers to design out waste, optimise material use and keep building elements/materials in use after the end of their life cycle. Table 4.2 highlights the proposed strategy.

The design objective for the elements with longer life cycle (more than 25 years) is to design for longevity, adaptability and flexibility. Concrete provides longevity and high thermal mass whilst steel is highly recyclable.

Building layers with shorter life expectancy (less than 25 years) will be designed for ease of maintenance, re-use and recoverability. The plant will be made accessible for replaceability and maintenance. In terms of building services strategy, the proposed development will be connected to a centralised heat pump system which will provide heating and cooling if required. More information about the energy strategy can be found in the Energy Statement.

Opportunities will be explored for reusing hoardings and scaffoldings. Discussions with suppliers with regards to the possibility of sending back the packaging for reuse will be explored. The development will also engage with manufacturers with 'take-back' schemes to reduce waste on site from off-cuts and surplus material. Further offsite and modern methods of construction may be considered to further optimise material use and waste minimisation.

Layer	Constituent elements	Strategies
Site	The geographical setting, urban location and external works	Not applicable
Substructure	Excavations, foundations, basements and ground floors	**Longevity** – durable and resilient; readiness for alternative technologies **Adaptability** – how the current needs might change in the future
Superstructure	Load-bearing elements above plinth including roof supporting structure	**Longevity** – durable and resilient; readiness for alternative technologies **Adaptability** – how the current needs might change in the future
Shell/Skin	The layer keeping out water, wind, heat, cold, direct sunlight and noise	**Longevity** – durable and resilient; readiness for alternative technologies **Adaptability** – how the current needs might change in the future
Services	Installations to ensure comfort, practicality, accessibility and safety	**Reusability** – designed to be redeployed of reused as kit of parts **Recoverability** – designed to be deconstructed and reused/recycled
Space	The layout internal walls, ceilings, floors, finishes, doors, fitted furniture	**Flexibility** – potential for reconfiguration/future refurbishment of non-structural parts
Stuff	Anything that could fall if the building was turned upside down	**Flexibility** – potential for reconfiguration/future refurbishment of non-structural parts
Construction Stuff	Any temporary installations/works/ materials, packaging and equipment	Not applicable

Table 4.2 Circular economy design approaches by building layer.

Please refer to Appendix **Error! Reference source not found.** for the detailed breakdown of circular economy principles by building layer, alongside the challenges, actions and counter actions, who and when, and the plan to prove and quantify.

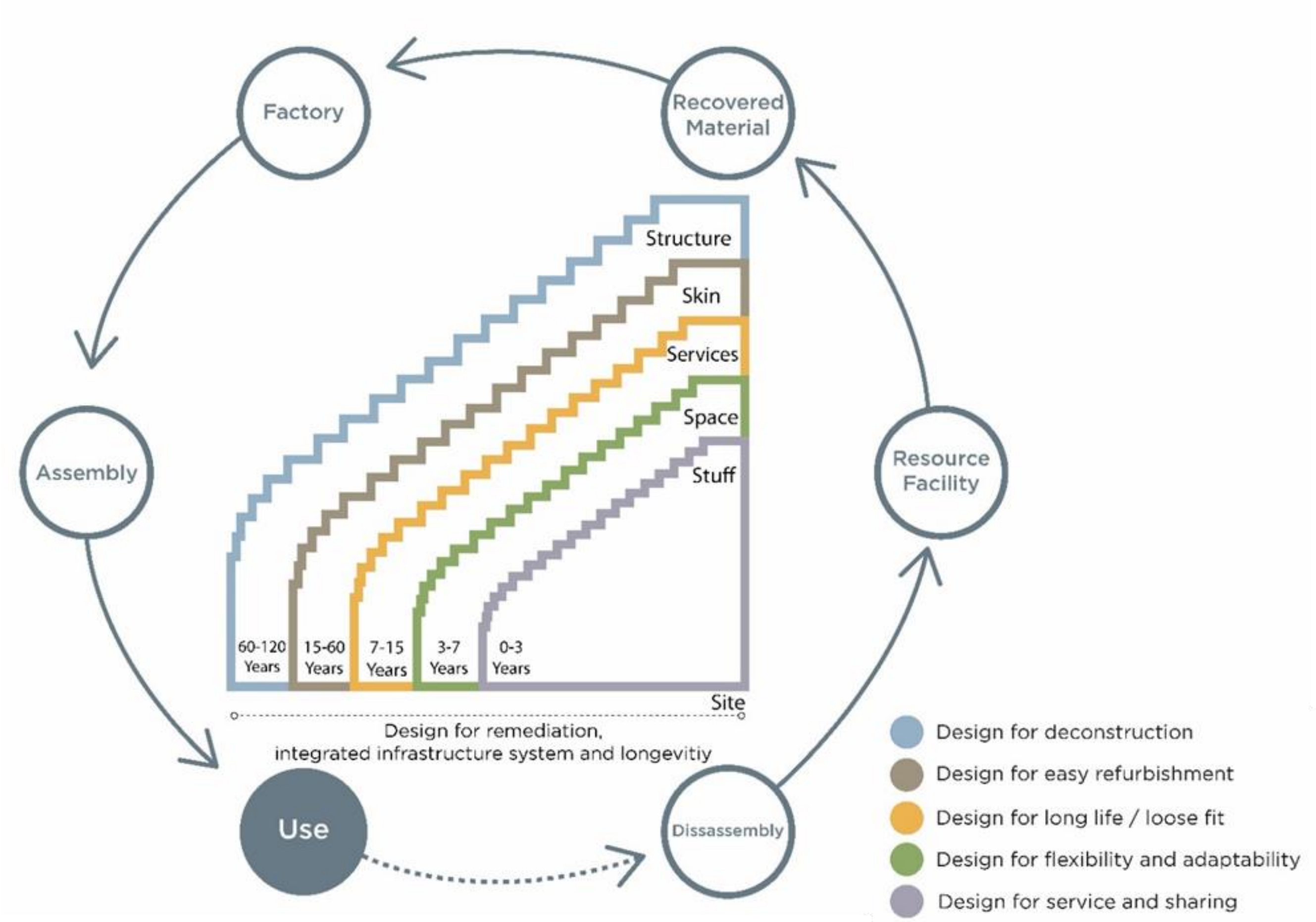

Figure 3-3 – Building layers and their indicative lifespans

Extra attention will be given to the materials procured and the supply chain ensuring they meet the required environmental credentials. Key objective is to use materials with high recycled content, renewable materials and reclaimed materials where feasible. In terms of the supply chain companies should have an up to date

Discussions with suppliers with regards to the possibility of sending back the packaging for reuse will be explored.

Where feasible offsite modular construction and design for manufacture and assembly construction methods will be considered to further optimise material use and waste minimisation.

The materials procured for internal finishes, partitions and furniture will have ingredients disclosed by the manufacturer, a disclosure organisation or a third party such as Declare label or equivalent. Biogenic material will be selected where possible.

The use of Building Information Modelling in the project could be of great relevance for estimating material quantities, thus reducing over procurement and waste generation.

5 Circular economy design principles

The six circular economy principles in line with Paragraph 3.3.10 of the London Plan, which have been used to guide the building design process, are:

1. building in layers – ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
2. designing out waste – ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials
3. designing for longevity
4. designing for adaptability or flexibility
5. designing for disassembly
6. using systems, elements or materials that can be reused and recycled.

The circular economy design principles have been adopted by building layer, as shown in Section 5. The following narrative summarises the key commitments of the Proposed Development.

5.1 Designing out waste

Minimising waste is about tackling waste reduction 'at source' and avoiding materials being classified as waste through careful design and specification. This has been considered at the early stages in the context of the whole lifecycle of the development, from strategic planning through to end of life.

Module A – Product sourcing and construction stage

Reducing the quantities of materials 'locked away' in the built environment is critical. The design of building infrastructure is important because it can influence the types and quantities of materials and other resources that would be used for many decades.

The proposed design has considered opportunities to reduce the demand for building materials including reusing and repurposing the existing basement and heritage north façade.

A whole life-cycle carbon (WLC) assessment has been undertaken to quantify the embodied carbon of the current building scheme. This would be updated at each design stage as more of the design becomes quantifiable, and the specific materials become known.

By conducting a WLC assessment at the early design stage, we are also able to identify the most contributing materials by mass and embodied carbon and investigate design changes to improve the overall embodied carbon.

All material specifications have been updated in line with ISO 204000 'Sustainable Procurement'. Priority would be given to products with Environmental Product Declarations (EPDs) to enable the accurate representation of the material within the WLC assessment.

The pre-demolition audit would allow any opportunities for the reuse and recovery of demolition materials to be identified. The scheme aims to divert 80% by volume (90% by tonnage) of demolition waste from landfill.

After opportunities to minimise the use of resources have been fully considered, the remaining waste would be managed in accordance to the Waste Hierarchy.

Module B – In-use stage

Whilst this report primarily focuses on materials, the design has also targeted the minimisation of other resources, including energy and water. See Table 5.1.

Resource	Commitments	Metrics
Energy	The design approach targets demand reduction measures first, giving priority to optimisation of building fabric to reduce the need for heating, cooling and artificial lighting. The objective is to make buildings as energy efficient (i.e. 'lean') as possible before considering any mechanical systems and on-site and off-site measures to deliver low carbon performance. The following passive design features are proposed: a) High levels of envelope insulation to reduce energy demand b) Airtight construction to prevent heat loss c) Optimised glazing-to-solid ratios to mitigate overheating risk and reduce cooling whilst maximising daylight d) Highly efficient double glazing throughout with coatings to prevent excessive solar gains The following energy-efficient plant is proposed: e) High-efficiency whole-house mechanical ventilation systems with high heat recovery rate f) Low energy lighting throughout with occupant detection where possible The following green energy systems are proposed: g) An all-electric air source heat pump solution to produce both heating, cooling and central hot water systems. h) Photovoltaics on the roof See the Energy Statement produced by chapmanbdsp for further details.	The operational energy has been minimised following the London Plan's Energy Hierarchy such that a 63% improvement in total carbon emissions can be achieved over Part L.
Water	i) Water efficient fittings and appliances would be specified throughout the scheme. j) A water meter with a pulsed output would be provided for the water supply of the building. k) Flow control devices that regulate the supply of water to each WC area or facility according to demand would be installed, thereby minimising water leaks and wastage from sanitary fittings; and l) A major leak detection system would be installed. See the Sustainability Statement produced by chapmanbdsp for further details.	Committed to reducing operational water use to 40% lower than the baseline in line with BREEAM NC v6 Wat 01.

Table 5.1 - Commitments to circular economy principle 1.2 - Minimise the quantities of other resources used.

Module C/D – End of life stage / Benefits and loads beyond the system boundary

It is extremely difficult to predict and/or influence how the building would be managed to reduce waste at the end of its life-cycle, in well over 60 years time. The current Building Circularity assessment has assumed the end-of-life (EOL) process to follow the market scenario. This assumes the standard practice EOL process is chosen for each material.

Other design initiatives to be explored as the design progresses includes products to be specified with a supplier take-back scheme where possible.

5.2 Designing for longevity

The materiality of the building skin has been selected with longevity in mind. Insulation types with extended lifespans have been selected to ensure the façade replacement can be reduced as much as feasible.

5.3 Designing for adaptability or flexibility

The design has incorporated the following potentials for adaptability or flexibility into the proposed design:

<u>Adaptability</u>

m) **Windows and retail fascia** – Designed to be removable and replaceable independent of building frame

n) Shell and core units for commercial elements

- Shell and core layout provides future tenants with flexibility in space planning and the ability to install various internal finishes
- All tenants fit-outs to be designed to be removable
- Multiple entrances provided for each unit to allow for a range of uses.

<u>Flexibility</u>

o) **Internal partitions** – Lightweight non-structural internal partitions give flexibility for the rearrangement of rooms.

5.4 Designing for disassembly

Recoverability has been ensured within the façade by designing for disassembly. The use of prefabricated/modular façade and adaptable glazing systems reduce on-site waste and allow for demountability at end of life.

The building services strategy for the proposed development would be designed with disassembly principles in mind. This would result in plant components to be easily accessible, and components dismantled and replaced where necessary on a part-by-part basis.

5.5 Using systems, elements or materials that can be reused and recycled

All material specifications have been updated in line with ISO 204000 'Sustainable Procurement'. Priority would be given to products with Environmental Product Declarations (EPDs) to enable the accurate representation of the material within the WLC assessment.

The proposed development will give preference to the selection of sustainable materials and the minimisation of waste. The following measures will be considered to demonstrate that the materials specified are sourced, managed and used in a sustainable manner.

p) The use of locally sourced materials will be prioritised, where feasible to reduce transport related emissions and to support local supply chains

q) Responsible sourcing of materials from suppliers that operate an Environmental Management System will be prioritised. 100% of all timber included in the construction of floors, roofs, walls and staircase will be legally sourced

r) The use of insulation materials with low Global Warming Potential (GWP) will be prioritised

s) The use of high VOC content paints, sealants and all ozone depleting materials including insulation will be avoided where feasible; and

t) Specific consideration will be given to flexibility, durability and strength of materials selected for the scheme.

u) Considering high cement replacement (with GGBS) in substructure and moderate in superstructure.

Recycled content for the main materials will meet and exceed the values from RICS as outlined in Table 5.2. Cement replacement will be maximised where practically achievable and will be reviewed in the next stage with the structural engineers.

Component	Recycled content	Reference
Concrete	20% cement replacement	[1]
Aluminium Sheet/profile	35% recycled content	[1]
Plasterboard	Minimum 60% recycled content	[2]
Timber (CLT/Glulam/softwood/plywood)	100% FSC/PEFC	[2]
Concrete Blocks	24%	[3]
Structural steel sections	20% recycled content	[1]
Steel reinforcement bars	97% recycled content	[1]
References: [1]: RICS Whole life carbon for the built environment PS; 1st edition (Nov 2017) [2]: IStrucE: How to calculate embodied Carbon (Aug 2020) [3] Concrete Block Association: Aggregate block sustainability (Feb 2013)		

Table 5.2 – Default recycled content specifications for main building materials

6 Circular economy design principles by building layer

Design Principles		Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing out waste	Module A - Product Sourcing and Construction Stage	• Potential for re-use of elements of the existing building to be reviewed. • The project is located on previously developed land with no impact on virgin land. • A Whole Life Carbon Assessment is being undertaken • Select locally sourced materials where possible. • Buildings orientation, massing and layout designed to optimise low-carbon design principles • Use of durable and long-lasting materials, particularly in high-traffic areas in the public realm and ground floor • Use of low-maintenance, sustainable and durable landscaping materials such as sustainabliy harvested timber products	GGBS (a waste by-product of iron and steel-making by-product) or fly-ash may be used for cement replacement to reduce impact on the land to generate cement and reduce the embodied carbon. The current assumption is 30% GGBS, however this will be reviewed and potentially increased as the design develops. • Steel rebars to have high recycled steel content (97%) • Prioritise the use of products with EPDs • Exploring the possibility of designing the substructure with a modular and prefabricated approach to allow for future adaptability and dissasembly • Using recycled and/or locally sourced materials as well as designing for efficient use of materials to minimise waste and maximise reuse or recycling opportunities • Basement location chosen to minimise disruption to neighbouring basements/buildings • A site waste management plan will be produced and followed. • Concrete demolition waste will be processed off site at a recycling facility for eventual use as aggregate products. • Basement design follows simple form located within the regular column grid • Use of flexible electrical and mechanical services layouts • Concrete structure is durable, resilient, and maintainable material that is likely to last significantly beyond its minimum design life.	• Optimise/standardise typical floor layout, resulting in lean design, repetitive structure and allowing reuse of in-situ concrete formworks. • Targeting high-percentage recycled content steel rebars. • Use of robust concrete frame to extend the lifespan of the building for as long as possible • Potential to use significant percentages of cement-replacement elements. Currently assumed as 30% GGBS. Potential to increase • Exploration into the use of pre-fabricated steel elements that are robust and corrision resistant • 'Structure designed with soft spots to allow for alteration to suit new uses or patterns of use in future.	• Robust and long-lasting finishes will be selected reducing the need of frequent maintenance and replacement. • Consider the use of recycled-content aluminium for the apertures. • A low heat loss form factor design reduces the exposed façade area • The design targets avoiding products with high embodied carbon. • Integration of green and blue roofs to improve insulation values and reduce stormwater run-off while improving air quality and visual amenity •Upgrading existing northern heritage facades to meet energy standards • The use of prefabricated/modular façade and adaptable glazing systems reduce on-site waste and allow for demountability at end of life. • Glass can be recycled and reused in other glass products or as aggregate • Prioritise material procurement from manufacturers adopting cleaner manufacturing processes and certified products i.e. EPDs, BES6001, FSC, PEFC, CARES, ISO14001	• Services to be accessible for ease of maintenance and replacement without damaging internal or external building elements. • Use of demountable and adaptable ceiling systems • Incorporating flexible, modular systems for MEP systems to allow for future adaptability and dissasembly • Avoid plant oversizing in keeping with 'Be Lean' principles	• Repetitive layouts are used across the different floors. Repetition and the reduction of bespoke pieces result in a lower amount of construction waste. • Integration of demountable and adaptable internal partitions where appropriate • Using durable, recyclable, and low-toxicity materials, such as low-VOC paints and finishes, recycled content carpet tiles, and FSC-certified wood products, where possible • Designing for material recovery and recycling at the end of the building's life, such as using demountable connections and material passporting for easy identification and separation	• Circular economy principles will be encouraged • Using sustainable packaging and shipping methods for products and materials, such as reusable and biodegradable packaging and choosing suppliers with sustainable transportation practices • Explore adopting circular procurement strategies, such as buying refurbished or remanufactured furniture and equipment • 'Internal doors and furniture are design to be reused in its original form with minimal reprocessing at end-of-life.	• Use of demountable and reusable scaffolding. • Promote the taking back of building materials packaging. • A Resource Management Plan (RMP) or Site Waste Management Plan (SWMP) will be implemented on site.
	Module B - In-Use Stage	• Adoption of sustainable landscaping techniques (blue & green roofs) that reduce water consumption and minimise the imact of flooding on the surrounding area. • Incorporation of flexible and multi-functional site layout and zoning within the public realm • Incorporation of green roofs, gardens and other green infrastructure to create adapatable spaces that be used for a variety of purposes over time • Minimum 60% municipal recycling rate by 2030.	• Concrete demolition waste will be processed off site at a recycling facility for eventual use as aggregate products. • Site waste management plan will be followed. • Use of flexible electrical and mechanical services layouts • Minimum 60% municipal recycling rate by 2030.	• Non-load bearing internal partitions may be dismantled to accommodate future needs for adaptability without damaging the building structure (building in layers) • Site waste management plan will be followed. • Minimum 60% municipal recycling rate by 2030	• Installation of solar panels on the roof to provide renewable energy, reducing operational energy. • Integration of green and blue roofs to improve insulation values and reduce stormwater run-off while improving air quality and visual amenity • Localised ventilation strategy within each room optimised to enhance natural ventilation through facade mounted louvres, reducing active cooling demand.	• Building services take into account future climate change scenarios. • Future resilience potential by development being designed to connect to a district network in the future. • Careful passive design helped to reduce the need for cooling in residential areas. • Careful plant sizing avoids over-sizing. • Energy demand is reduced following the Energy Hierarchy; enhancing the fabric performance,	• Ineternal walls are non-load bearing and can be removed over time if desired to create different spaces	• Products and materials designed for disassembly and reusability, which use standardised connectors and fasteners allowing them to be maintained/upgraded over the lifespan	• Sustainable Procurement Plan to be reviewed with the contractor during pre-construction supply chain engagement • A site waste management plan to be followed on site • To be reviewed with the contractor during pre-construction supply chain engagement

Design Principles	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
					servicing strategy selected and building services efficiency as noted in the Energy Assessment • Localised ventilation strategy within each room optimised to enhance natural ventilation , reducing active cooling demand. • Use of water and energy-efficient and recyclable building systems, equipment and controls • Use of renewable energy sources such as solar panels on the roof to reduce on-site energy demand			
Module C - End-of-Life Stage	• Aim to achieve 95% diversion from landfill • Meet or improve upon <13.3 m3/100m2 GIFA or <11 tonnes/100m2 GIFA for non-hazardous construction waste	• Aim to achieve 95% diversion from landfill • Meet or improve upon <13.3 m3/100m2 GIFA or <11 tonnes/100m2 GIFA for non-hazardous construction waste	• Aim to achieve 95% diversion from landfill • Meet or improve upon <13.3 m3/100m2 GIFA or <11 tonnes/100m2 GIFA for non-hazardous construction waste	• Aim to achieve 95% diversion from landfill • Meet or improve upon <13.3 m3/100m2 GIFA or <11 tonnes/100m2 GIFA for non-hazardous construction waste	• Aim to achieve 95% diversion from landfill • Meet or improve upon <13.3 m3/100m2 GIFA or <11 tonnes/100m2 GIFA for non-hazardous construction waste• Any Heat pumps refrigerant used are to be captured at end-of-life	• Aim to achieve 95% diversion from landfill • Meet or improve upon <13.3 m3/100m2 GIFA or <11 tonnes/100m2 GIFA for non-hazardous construction waste	• Circular economy principles will be encouraged • Segregated waste bins are to be provided • Explore the possibility of implementing material tracking and management systems to facilitate material reuse and recycling, such as tracking material flows and maintaining an inventory of available materials	• 95% of the waste will be reused or recycled in line with the London Plan guidance. • Contractor to manage & monitor waste flows. • ≥95% of beneficial reuse of excavation waste • To be reviewed with the contractor. • Contractor will segregate and monitor waste generated during construction
Module D - Benefits and Loads Beyond the System Boundary	Refer to 'Module C - End-of-Life Stage'	Refer to 'Module C - End-of-Life Stage'	Refer to 'Module C - End-of-Life Stage'	Refer to 'Module C - End-of-Life Stage'	Refer to 'Module C - End-of-Life Stage'	Refer to 'Module C - End-of-Life Stage' • Designing for material recovery and recycling at the end of the building's life, such as using demountable connections and material passporting for easy identification and separation	Refer to 'Module C - End-of-Life Stage'	Refer to 'Module C - End-of-Life Stage'

Design Principles	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing for longevity	Refer to 'Designing out Waste Design Principles' above • Use of durable and long-lasting materials, particularly in high-traffic areas in the public realm and ground floor • Use of low-maintenance, sustainable and durable landscaping materials such as sustainabliy harvested timber products	Refer to 'Designing out Waste Design Principles' above '• Substructure will be designed for a minimum design life of 60 years.	Refer to 'Designing out Waste Design Principles' above • Use of robust concrete frame to extend the lifespan of the building for as long as possible '• Materials specified for durability and longevity	Refer to 'Designing out Waste Design Principles' above • Robust and long-lasting finishes will be selected reducing the need of frequent maintenance and replacement. • Use of robust and low-maintenance cladding systems with high quality materials such as brick and aluminium reduces material replacement over the lifecycle • Insulation materials with longer life expectancies have been selected to avoid the premature end of life of the façade, and less maintenance.	Refer to 'Designing out Waste Design Principles' above • HVAC can be adapted to allow for future connection to district heating system. Main items of plant will have long design life and can be maintained by repair and replacement of components for several decades.	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above
Designing for adaptability or flexibility	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above • Exploring the possibility of designing the substructure with a modular and prefabricated approach to allow for future adaptability and dissasembly	Refer to 'Designing out Waste Design Principles' above • Non-load bearing internal partitions may be dismantled to accommodate future needs for adaptability without damaging the building structure (building in layers) • 'Structure designed with soft spots to allow for alteration to suit new uses or patterns of use in future.	Refer to 'Designing out Waste Design Principles' above • Use of passive solar design with large glazing and operable vents with openable panels to prioritise natural ventilation	Refer to 'Designing out Waste Design Principles' above • Use of demountable and adaptable ceiling systems • Use of high-quality, flexible and durable building services equipment • Future resilience potential by development being designed to connect to a district network in the future.	Refer to 'Designing out Waste Design Principles' above • Integration of demountable and adaptable internal partitions where appropriate • Internal walls are non-load bearing and can be removed over time if desired to create different spaces	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above

Design Principles	Site	Substructure	Superstructure	Shell/Skin	Services	Space	Stuff	Construction Stuff
Designing for disassembly	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above • Exploring the possibility of designing the substructure with a modular and prefabricated approach to allow for future adaptability and dissasembly • Use of flexible electrical and mechanical services layouts	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above • The use of prefabricated/modular façade and adaptable glazing systems reduce on-site waste and allow for demountability at end of life. • Use of modular, pre-fabricated, durable and long-lasting window, door and flooring systems with easy to replace components • Using mechanical fixings to allow for easy dissasembly and reuse of facade components	Refer to 'Designing out Waste Design Principles' above • Use of demountable and adaptable ceiling systems • Use of high-quality, flexible and durable building services equipment	Refer to 'Designing out Waste Design Principles' above • Integration of demountable and adaptable internal partitions where appropriate	Refer to 'Designing out Waste Design Principles' above • Products and materials designed for disassembly and reusability, which use standardised connectors and fasteners allowing them to be maintained/upgraded over the lifespan	Refer to 'Designing out Waste Design Principles' above • Use of demountable and reusable scaffolding.
Using systems, elements or materials that can be re-used and recycled	Refer to 'Designing out Waste Design Principles' above • Potential for re-use of elements of the existing building to be reviewed. • Select locally sourced materials where possible.	Refer to 'Designing out Waste Design Principles' above • GGBS (a waste by-product of iron and steel-making by-product) or fly-ash may be used for cement replacement to reduce impact on the land to generate cement and reduce the embodied carbon. The current assumption is 30% GGBS, however this will be reviewed and potentially increased as the design develops. • Steel rebars to have high recycled steel content (97%) • Early contractor engagement will be sought to design out or minimise waste arising from excavation and construction.	Refer to 'Designing out Waste Design Principles' above • Targeting high-percentage recycled content steel rebars. • Potential to use significant percentages of cement-replacement (GGBS) in concrete elements. Currently assumed as 30% GGBS. Potential to increase	Refer to 'Designing out Waste Design Principles' above • Consider the use of recycled-content aluminium for the apertures. • Glass can be recycled and reused in other glass products or as aggregate	Refer to 'Designing out Waste Design Principles' above	Refer to 'Designing out Waste Design Principles' above • Using durable, recyclable, and low-toxicity materials, such as low-VOC paints and finishes, recycled content carpet tiles, and FSC-certified wood products	Refer to 'Designing out Waste Design Principles' above • Using sustainable packaging and shipping methods for products and materials, such as reusable and biodegradable packaging and choosing suppliers with sustainable transportation practices • Explore adopting circular procurement strategies, such as buying refurbished or remanufactured furniture and equipment • 'Internal doors and furniture are design to be reused in its original form with minimal reprocessing at end-of-life.	Refer to 'Designing out Waste Design Principles' above

7 Numerical Targets and Commitments

7.1 Bill of materials

Result category	Material quantity (kg)	Material intensity (kg/m²)	Recycled content by value (%)	Estimated recyclable materials (kg/m²)
1 Substructure	8,975,848	241.01	37.34	240.14
2.1 Superstructure: Frame	8,964,614	240.06	45.04	240.06
2.2 Superstructure: Upper Floors	21,754,292	581.43	38.21	558.93
2.3 Superstructure: Roof	3,496,410	93.57	33.94	92.84
2.4 Superstructure: Stairs and Ramps	400,657	10.73	33.12	10.73
2.5 Superstructure: External Walls	10,004,072	271.57	0.8	268.22
2.6 Superstructure: Windows and External doors	331,167	8.45	35	7.9
2.7 Superstructure: Internal Walls and Partitions	686,766	19.77	18.77	17.88
2.8 Superstructure: Internal doors	146,010	3.72	0	0
3 Finishes	7,303,946	210.46	16.82	191.9
4 Fittings, furnishings & equipment	166,880	4.43	0	0.08
5 Services (MEP)	577,952	14.9	45.69	13.58
8 External works	2,487,682	64.15	19.57	14.37
Total	**69,176,742.26**	**1,764.26**	**20**	**1665.63**

Table 7.1 – Bill of materials including recycled content by value (%).

The scheme will endeavour to meet the 20% requirement for recycled content by value, as per the GLA Circular Economy guidance.

Recycled content by value is a function of the material value of a component, the quantity used and the percentage of the component by mass that is derived from recycled content.

The full GLA Recycling and Waste Reporting Form can be found in the GLA excel sheet.

Materials' Circularity

The following materials' circularity figures are based on the preliminary assessment carried out using the 'OneClick LCA' tool used for the WLC assessment (see separate report). This will continue to be monitored and refined in the next design stages.

Materials	Material quantity (tons)	Recycled and Reuse (%)	Downscaling and use as energy (%)	Circularity (%)
Concrete	39,912.90	0	100	27.48
Metals	2,387.14	100	0	95.28
Bricks and ceramics	5,673.52	0	100	25.54
Gypsum-based	9,367.62	25.34	62.67	32.09
Insulation	158.3	0	0.89	12.36
Glass	17.5	100	0	50.0
Wood and biogenic	583.47	0	100	100
Earth masses and asphalt	5,852.26	48.41	51.59	37.1
Other materials	1,343.55	61.78	30.05	56.4

Table 7.2 - Estimated circularity by material for the Site.

Recycling and Waste Reporting data, a Site Waste Management Plan and an Operational Waste Management Plan will be used to inform the recycling and waste management processes.

A Whole Life Cycle (WLC) Assessment is being submitted as a separate document and shows that the current design A-C emissions amount to 749 $kgCO_2e/m^2$, within the GLA benchmark 1200 $kgCO_2e/m^2$.

The WLC includes a list of the materials and a list of all the EPDs that were used in the embodied carbon calculation. These are provided in the WLC report.

7.2 Recycling and waste reporting

A summary of the recycling and waste reporting table is given below. The Revised Waste Management Strategy Addendum prepared by Momentum can be found in Appendix 11.3.

In line with London Plan Policy SI 7, this table demonstrates: how all materials arising from demolition and remediation works will be reused and/or recycled; opportunities for managing as much waste as possible on site; how much waste the proposal is expected to generate; and how and where the waste will be managed in accordance with the waste hierarchy.

Type of waste	Source of information	Overall waste (tonnes)	Total reuse (%)	Total recycle (%)	Total reuse and recycle (%)
Product and construction stage (module A)					
Demolition waste	Pre-demolition audit (Salter demolition)	2,386	0%	95%	95%
Excavation waste	Cost Plan (Quantem) Total excavation = 4,996 m3 Assuming a soil density of 1760 kg/m3 in line with One Click LCA database.	1,642.08	95%	0%	95%
Construction waste	BREEAM Wst 01 <13.3 m3/100m2 GIFA or <11.1 tonnes/100m2 GIFA	4,352	0%	95%	95%
Use stage (module B)					
Municipal waste	Revised Waste Management Strategy Addendum (Momentum)	2,373.7	0%	39%	39%

Table 7.3 – Recycling and waste reporting summary.

Please note that the 'Revised Waste Management Strategy Addendum' by Momentum should be revised during the detailed design phase to comply and/or exceed the GLA policy requirement of 65% of municipal waste recycling rate by 2030.

7.3 Operational waste

In support of circular economy principles, a Revised Waste Management Strategy Addendum has been prepared for planning which gives an overview of the design proposals that will ensure that operational waste will be stored, collected and disposed of effectively over the lifespan of the scheme, within guidelines set out by the relevant policies and best practice.

Relevant national, regional and local waste policies include :

- Ministry of Housing, Communities and Local Government (MHCLG), *National Planning Policy Framework (2021)*
- MHCLG, *National Planning Policy for Waste* (2014)
- Department for Environment, Food and Rural Affairs (Defra), *Our waste, our resources: a strategy for England* (2018)
- The London Plan 2021, Policies S17 and D6

- Richmond Upon Thames Local Plan 2018 Policy LP 24 states that waste management should follow the waste hierarchy principles which is to reduce, reuse or recycle as close as possible to where it is produced
- The West London Waste Plan provides a planning framework for the management of all waste produced by the six West London Boroughs of Brent, Ealing, Harrow, Hillingdon, Hounslow and Richmond upon Thames.

Waste generated on Site through the occupation of the proposed development will be managed in an appropriate and sustainable way. It will follow the principles of the Waste Hierarchy - 'eliminate, reduce, reuse, recycle' to enable the environmental, social and economic risks from waste to be reduced and national and local policy aspirations to be supported.

Relevant planning policies and guidance documents have been taken into consideration throughout the development of this Strategy. The main operational waste management targets (in accordance with Waste Hierarchy) that apply to this proposed development, include:

- To increase the recycling and composting of municipal waste by 65% by 2030.

Please, refer to Appendix 11.3 for detail information.

8 Implementation Strategy

A Site Waste and Resource Management Plan (SWMP/RMP) will be prepared and implemented by the contractor, including procedures and commitments to sort and divert waste from landfill, through either:

- Reusing the material on site (in-situ or for new applications)
- Reusing the material on other sites
- Salvaging or reclaiming the material for reuse
- Returning material to the supplier via a 'take-back' scheme
- Recovery of the material from site by an approved waste management contractor and recycled or sent for energy recovery.

Waste materials will be sorted into separate key waste groups, such as bricks, concrete, insulation, packaging, timber, electricals, plastics, glass, etc., according to the waste streams generated by the scope of the works either onsite or offsite through a licensed contractor for recovery.

The Plan should also cover the following:

- Procedures and commitments for minimising non-hazardous waste in line with the benchmark
- Procedures for minimising hazardous waste
- Procedures for monitoring, measuring and reporting hazardous and non-hazardous site waste
- Procedures for sorting, reusing and recycling construction waste into defined waste groups, either on site or through a licensed external contractor
- The name or job title of the individual responsible for implementing the above

The plan should be in line with guidance provided by DEFRA, Building Research Establishment (BRE) and Waste & Resources Action Programme (WRAP). Where materials cannot be reused or recycled on-site, the contractor will identify opportunities for potential reuse off-site. Material and waste generated through construction will be stored safely and efficiently, prior either for reuse on site or removal. Any materials to be reclaimed / reused will be done so in accordance with the WRAP protocol.
The waste reports and records will be reviewed and audited periodically. They will be discussed with the Sustainability champion on site.

The appointed construction Contractor will take appropriate measures on site to further reduce the environmental impact of the construction by adopting the following:

- The contractor will register with the Considerate Constructor's Scheme and aim to attain a high score in all categories
- Energy efficient equipment, services and construction methods will be adopted to reduce energy consumption.
- Water use will be minimised during operation, installation, and construction processes
- Energy including fuel and water use will be recorded on site during the construction process
- Measures will be put in place to mitigate the potential pollution from the Site to land, air or water including noise and dust
- The main contractor will operate as per the guidelines set by ISO 14001 Environmental Management System (or an equivalent standard) and encourage the same throughout the supply chain
- Strategic planning will be done in advance to minimise transport to and from the Site to reduce greenhouse gas emissions
- Carbon footprint of material transportation should be recorded through Key Performance Indicator (KPI) sheet.

9 End of Life Strategy

One Click LCA GLA Building Circularity tool was used to estimate the opportunity for returning the material at the end of life of the building. The End of Life (EoL) scenarios are noted within the Whole Life-Cycle Carbon Assessment.

It is difficult to predict construction processes, reusable, and recycled value in 60(+) years, however, based on current practices and industry benchmarks applied by the One Click tool, an estimation is produced by the tool and can be seen in the diagram below.

This building's circularity is evaluated in terms of the mass of the recovered building material as compared to virgin material likely to be used in the building construction and the percentage of the material that can be returned to building construction at the end of life of the building.

The calculation takes into account the reused, recycled and renewable materials to ascertain the mass of the recovered material as compared to virgin material. In this case material recovered (i.e. use of recycled material or reuse) is estimated to be 8.8%. in the project. It is the mass-based share of recycled, reused or renewable materials of the total materials used.

Downcycled and recycled materials are estimated to be 84% and 9.8% respectively and they represent the end-of-life handling of materials that were used in the project. It is the mass-based share of materials that are either recycled or reused as material, added to the materials that are either downcycled (with value loss, such as reuse of concrete aggregates) or used as energy (such as wood or plastic product incineration.

As mentioned, it is difficult to predict the recycling rates in 60 years' time, however, it has been considered that at least current rates of recycling will be achievable in some cases e.g. steel. The rest of the inputs are based on industry benchmarks applied by the software. It is also assumed that most of the concrete, bricks and ceramics, by mass, are likely to be downcycled, which means crushed and used as aggregate at the end of life.

The Building Circularity score, (in this case 33%) shown in the middle, is the average from the recycled materials implemented in the project and the materials to be recycled/downcycled at the end of life (i.e. (7.7%+(85.1%/2+8.6%)/2).

The design team will endeavour further strategies to improve the buildings' circularity in the following design stages.

The results are based on inputs used for the whole life carbon analysis where material quantities and specification inputs are aligned with those developed by the cost consultant.

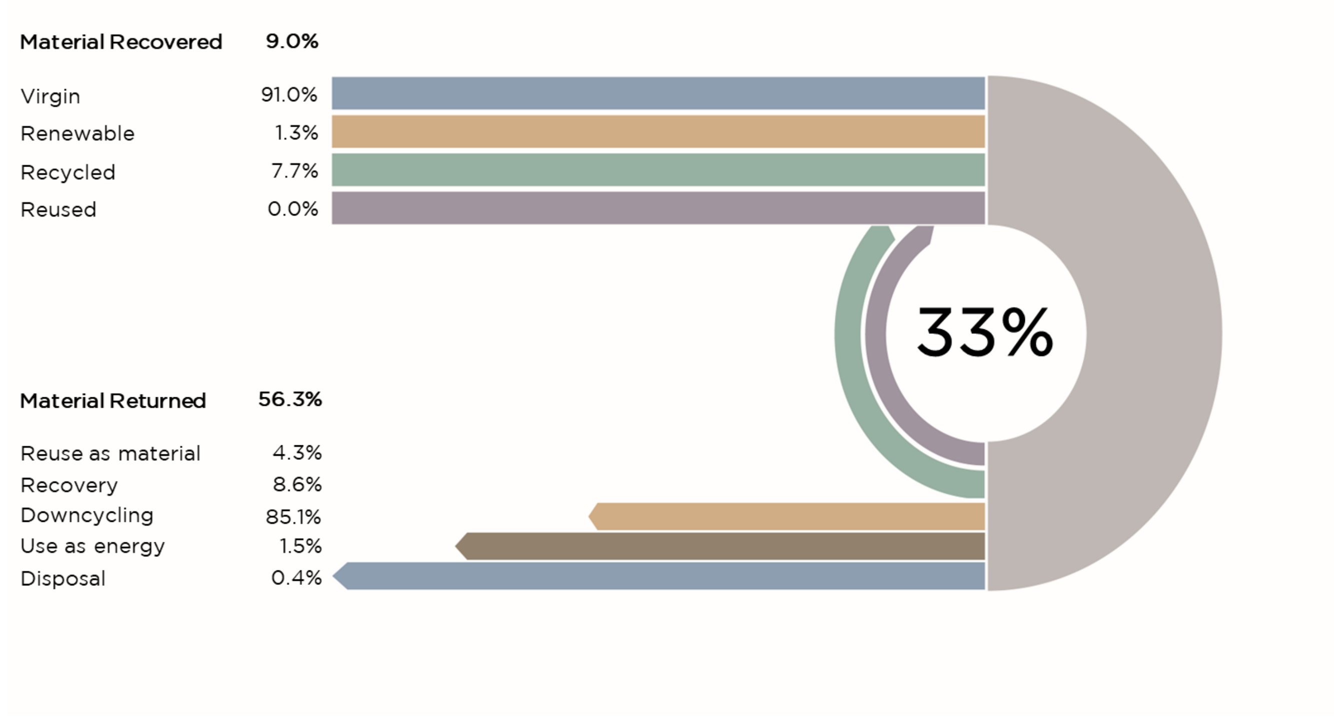

Figure 9.1– Building circularity diagram (from One Click LCA).

10 Conclusion

This report covered circular economy approaches for the proposed development and the municipal waste during operation.

The existing site and buildings have been assessed for refurbishment, repurpose, disassembly or demolition and it has been decided that the existing buildings will be demolished.

The design team explored options for: designing out waste, longevity, adaptability/flexibility, disassembly and using systems/elements/materials that can be re-used and recycled.

It has been targeted to minimise the quantities of materials used along with other resources such as energy, water and land and to implement sustainable/responsible sourcing of materials.

Waste hierarchy has been set up and it aims to reduce, reuse, recycle and recover materials with an emphasis on recycled content in the waste hierarchy, the following targets have been set up for excavation 95%, construction 95% and municipal waste 65%.

The circularity approach includes as much information as possible at this stage towards embedding the principles and will endeavour to continue as such so that these are translated into the actual buildings. It can be appreciated that many of the materials and products applied in the analysis may be different to those used for construction due to unknown markets and sources. However, the circularity principles applied through design and specification will support a positive outcome.

The bill of materials for all building layers has been modelled with an emphasis on the substructure and the frame. The bill maps the recycled content and wastage in addition to recycling and reusing potential at and after buildings' end of life.

11 Appendices

11.1 The GLA CE spreadsheet

The GLA circular economy spreadsheet submitted separately as a standalone spreadsheet.

11.2 Pre-demolition Audit

Pre Demolition Audit
for
Homebase, Manor Road, Richmond

BREEAM WST01 - Construction Waste Management

Report compiled by:
Zoë Graves AIEMA
Revision 00

Aim
The aim of this report is to promote efficiency via the effective management and reduction of construction waste.

Project summary
The site comprises of a Homebase store which is located towards the southern end of a large retail plot. This building is of steel portal frame construction and has brick/blockwork infill panels to the perimeter. The ground bearing slab is of RC construction and it is understood that the foundations are localised pad foundations.

The strip out and demolition works are to include the removal of the following items:

- Shelving
- Racking
- Floor tiles
- Tarmac
- Metal
- Mechanical plant, pipework and ductwork
- Electrical services
- Cables
- Doors
- Internal
- Non-load bearing plasterboard walls and blockwork masonry walls

Method and Approach
The design process has been extensive and has gone through the process of ascertaining efficient use of materials and focusing on reuse and recycle existing material where at all possible, whilst limiting material wastage.

The project involves the soft strip works, prior to the full demolition of the building. In the application of the waste hierarchy to these specific works, focus is given to reuse of materials and the recycling of as much of the waste arisings as possible. Estimates for these are given in the Recycling Pre Demolition Estimate below.

During the soft strip and demolition planning, various materials are assessed and planned how they would be recycled and/or reused. These include:

- Metals
- Brick and concrete
- Plasterboard
- Strip out waste
- Tarmac
- Insulation

Waste Hierarchy

Prevention
The nature of demolition works means that prevention cannot be applied.

Reuse
Opportunities for reuse of materials include:

- Some of the existing equipment such as racking and shelving can be sold and reused.
- Some ferrous and non ferrous metal, suitable for reuse can be sold and reused.

Recycle/Recover

- Steelwork frame – potential for recycling as is or processed for reuse.
- The ground floor concrete slab and foundations are constructed of RC concrete, all will be demolished and crushed to a 6F2 specification for reuse within the site.
- Clean concrete will be processed back to aggregate for concrete construction.
- Other ferrous and non ferrous metals, not suitable for reuse will be processed into new products.
- Plasterboard is separated into its powder and paper elements, the powder is processed for use in new plasterboard and new cement and the paper element is used for new paper and animal bedding.
- Insulation can be limited in its recoverability due to potential contamination. Where possible, insulation will be recovered at the recycling facility for reprocessing. Contaminated insulation will need to be forwarded for disposal.
- Tarmac, in some instances, can be recycled for reuse. However, tar bound product cannot be recycled and has to be disposed of as a waste product.

Dispose

- Insulation – please see note above.
- Tarmac – please see note above.

Opportunities for reuse within the development works

- The ground floor concrete slab and foundations are constructed of RC concrete which will all be demolished and crushed to a 6F2 specification for reuse on site.

Targets for reuse
Setting reuse targets for a project of this nature are limited due to the scope of works and type of items available for reuse opportunities. Selling equipment comes with inherent limits such as the ability to provide specific guarantees or warranties which may not be available for the buyer and would be restrictive in attaining a set re-use target.

Targets for recycling - Recycling Pre-Demolition Estimate
A waste management strategy and estimate tonnage has been compiled below for material arising during the soft strip and demolition of the project and site clearance.

We have identified 7 main refurbishment waste groups. These include: steel, metal waste (other than steel), plasterboard, concrete (clean and in mixtures), mixed construction and strip out waste and insulation. The target recycling is a 95% diversion from landfill.

Please note that a recycling pre-demolition estimate has not currently been included for tarmac as the suggested recycling rates would be dependent on confirmation of the type of tarmac present on site following investigations.

1. Steel (from framework)

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Steel	150	100%	17 04 05

2. Metal waste (other than steel)

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Metal	20	100%	17 04 05

3. Plasterboard (Gypsum) – non-hazardous

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Plasterboard	50	100%	17 08 02

4. Concrete (clean)

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Concrete (clean)	1800	100%	17 01 01

5. Concrete, blockwork and masonry (in mixtures) – non hazardous

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Concrete, blockwork and masonry (in mixtures)	216	100%	17 01 07

6. Mixed construction and strip out waste

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Strip out waste	100	90%	17 09 04

7. Insulation

Product	Weight (Tonnes)	Suggested recycling rate	European waste catalogues code
Insulation	50	20%	17 06 04

NB. The values in this report are an estimate derived from a desk top study of the drawings, schedules, photos and site visits.

Reclamation

A general note is that the materials should be reclaimed as close to the site of origin as possible as to reduce costs.

Suggested recycling and reclamation centres:

- Westminster Waste
- RMS Recycling

Conclusion

The aim of this report is to promote efficiency via the effective management and reduction of construction waste.

The purpose of going through this process is to avoid waste being disposed in landfills. The waste hierarchy to remember as listed in The Waste (England and Wales) Regulation 2011:

1. Prevention
2. Reuse
3. Recycle
4. Recover
5. Dispose

This report has been compiled based on our best estimate of the materials and components of Homebase, Manor Way, Richmond.

11.3 Revised Waste Management Strategy Addendum

MANOR ROAD, RICHMOND

Revised Waste Management Strategy Addendum

23/01/2023

DOCUMENT CONTROL ISSUE SHEET

Project & Document Details

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Project Number	M000476
Document Title	Revised Waste Management Strategy Addendum

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1. INTRODUCTION

1.1.1 Momentum Transport Consultancy (‘Momentum’) has been appointed by the applicant, Avanton Richmond Development Ltd to provide an Addendum Revised Waste Management Strategy to support the planning application for the residential and commercial development at Manor Road, North Sheen, within the London Borough of Richmond upon Thames (LBRuT).

1.1.2 This is an addendum to the previously submitted Revised Waste Management Strategy submitted in November 2019, and addendums which followed in 2020 and 2021.

1.1.3 This Addendum Revised Waste Management Strategy details the strategy for waste management at the site, providing an overview of the provision of waste and recycling throughout the development as well as providing details on how waste will be collected.

1.1.4 This Addendum Report also takes into consideration the London Borough of Richmond upon Thames’ Local Plan Supplementary Planning Document on Refuse and Recycling. The document was adopted on 22 December 2022 and provides revised guidance on storage and access requirements for New Developments.

1.1.5 This information has been produced to provide LBRuT officers with comfort that the waste strategy for the development is suitable, well managed and efficient, and will operate effectively when the site is in full occupation.

1.1.6 This section of the report forms the introduction. The rest of the report outlines the updated waste storage requirements and waste collection layout.

DEVELOPMENT PROPOSALS

1.1.7 The development proposals are described as: “*Demolition of existing buildings and structures and comprehensive phased residential-led redevelopment to provide 453 residential units (of which 173 units will be affordable), flexible retail, community and office uses, provision of car and cycle parking, landscaping, public and private open spaces and all other necessary enabling works*.”.

POLICY CONTEXT

1.1.8 This addendum has been considered in relation with the following policies:

- National Planning Policy Framework (2021)
- Waste Management Plan for England (2021)
- London Plan (2021)
- London Borough of Richmond upon Thames Local Plan (2018)
- London Borough of Richmond upon Thames Local Plan Supplementary Planning Document: Refuse and Recycling: Storage and Access Requirements for New Developments (2022)

2. WASTE STORAGE REQUIREMENTS

2.1 Waste Storage Requirements

2.1.1 It is proposed that both the general and recyclable waste arisings are stored in 1,100L Eurobins for both the residential and commercial waste.

2.1.2 LBRuT waste guidance states that capacity for future food waste provision must also be provided. Food waste can be stored in 140L and 240L bins, therefore It is proposed to use 240L ‘wheelie’ bins for communal food waste collection for both the residential and commercial land uses.

2.1.3 Two waste collections are proposed per week. One of these will be the waste collection provided by LBRuT, which at the time of writing occurs on a Tuesday. The other will be provided through a private contractor. Thus, the waste management strategy assumes two collections per week.

2.1.4 The LBRuT Refuse and Recycling Storage Requirements state that, although at present developments such as the one proposed at Manor Road do not receive weekly food waste collections, “i*t is likely that new legal requirements will extend weekly food waste collections to all domestic developments over the coming years and all waste storage facilities in proposed developments producing household waste must provide suitable and sufficient space for separate containers for food waste in addition to containers for refuse and dry recycling to future-proof them against this likelihood”.* It is presumed that any extension of the local authority’s current food waste collections would be in line with current provision of once per week, and food waste generation is assumed to be based on a twice-weekly collection, where a private contractor conducts the other food waste collection.

2.1.5 Until the local authority extends food waste collections to developments such as the proposed development at Manor Road, food waste will be collected twice weekly by the private contractor.

2.1.6 No waste compactors are proposed for the development.

2.1.7 As stated in the introduction, the residential development quantum consists of 453 units, comprising 30 studio apartments, 143 one-bedroom units, 246 two-bedroom units, and 34 three-bedroom units. Studio apartments have been assumed to be one-bedroom apartments for the purposes of this assessment, based on the information provided in the LBRuT Refuse and Recycling Storage Requirements (LBRuT RRSR).

2.1.8 LBRuT RRSR states that in residential developments using communal refuse storage containers, such as the proposed development at Manor Road, storage capacity should be provided of 70 litres per bedroom, plus 30 litres per household. This requirement relates to communal waste containers. The LBRuT RRSR states that, for recycling, 110L per household (55L of paper / card recycling and 55L of mixed container recycling) should be provided. Additionally, a further 23L of food waste recycling should be provided per household.

2.1.9 To create a robust assessment for waste generation, the commercial space has been assumed to be food retail.

2.1.10 In previous iterations of this Addendum Report, commercial food waste was assumed to be non-recyclable waste. However, for robustness of calculations, commercial waste generation rates have come from Westminster City Council Recycling and Waste Storage Requirements (WCC RWSR) (2021), which state that for every 1,000m^2 of floor space, 3,500L of waste storage must be provided, of which 30% should be for general waste, 30% for separated recyclable waste, and 40% for food waste. This is in lieu of generation values from LBRuT RRSR, and come from “other published reliable sources” as permitted in the LBRuT RRSR.

2.1.11 Based on the waste generation rates detailed within LBRuT RRSR (for Residential) and WCC RWSR (for Food Retail), it is forecast that the proposed development will generate the following waste outputs, assuming a seven-day, uncompacted output. This was calculated based on the most recent area schedule, dated 21st July 2020.

Table 2.1: Forecast Waste Generated by the Proposed Development

Land Use	General (L)	Recyclable (L)	Food Waste (L)	Total (L)
Residential (C3)	67,280	49,830	10,419	**127,529**
Commercial *assumed food retail*	520	520	693	**1,733**
Total	**67,800**	**50,350**	**11,112**	**129,262**

2.1.12 Table 2.1 shows that general waste forms the main stream of waste, with 53% of the total, with non-food recyclable waste making up 39%. Food waste makes up 8%. Due to the size of the respective land uses, the residential development expectedly generates the bulk of the waste on-site.

2.1.13 Based on the weekly waste generation rates, a total of 108 x 1100L bins would be required. Additionally, 47 x 240L bins would be required for food waste, of which 44 would be for residential use.

2.1.14 Table 2.2 shows the number of bins proposed to be provided within the development, assuming a half weekly collection.

Table 2.2: Waste Storage Requirements (Uncompacted Half-Weekly Output)

Land Use	General	Recyclable	Food Waste	Total
	Bin Type: 1100L Eurobin		*Bin Type: 240L Wheelie Bin*	
Residential (C3)	31	23	22	76
Commercial *assumed food retail*	2	2	2	6
Total	**33**	**25**	**24**	**82**

2.1.15 As detailed above, by assuming a twice-weekly collection, the provision of 58 bins at 1,100L per bin (providing 63,800L of capacity) is sufficient in accommodating the assumed weight of waste generated. Additionally, for twice-weekly food waste collections, a total of 24 x 240L wheelie bins would be required, of which 22 would be for residential land uses and two for commercial as a minimum.

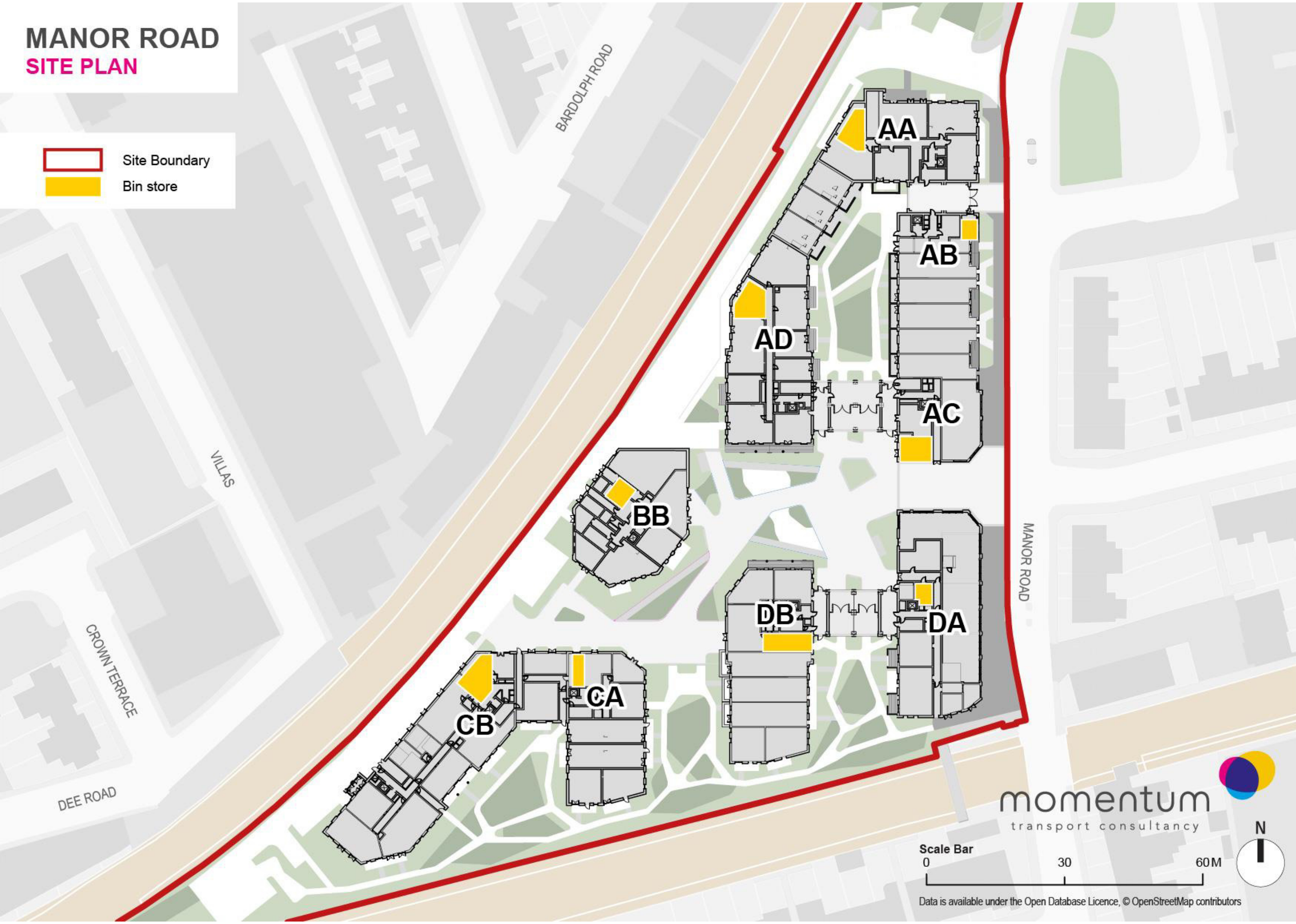
2.1.16 Table 2.3 shows this in more detail.

Table 2.3: Waste Generation vs Capacity

Land Use	Weekly Waste Generation (Total)	Half-Weekly Waste Generation	Waste Storage (Capacity)
Residential	127,529 L	63,765 L	64,680 L
Commercial *assumed food retail*	1,733 L	867 L	4,880 L
Total	**129,262**	**65,556 L**	**69,560 L**

2.1.17 The distribution of these bins is based on nine sites across the wider masterplan. These sites and the distribution of the bins are shown in Table 2.4. The locations are mapped in Figure 2.1.

Figure 2.1: Location of Bins on Site



2.1.18 The 1100L bins provided by LBRuT are 130cmx136cmx107cm. Additionally, the 240L wheelie bins provided for food waste by LBRuT are 107cmx58.5cmx74cm. Therefore, the total area needed for bin storage (including a circulation factor of 2) within each of the locations is also shown in Table 2.4.

Table 2.4: Distribution of Waste Provision

Location	General	Recyclable	Food	Area Required (sqm)	Area Provided (sqm)
AA	6	5	2	28.3	41
AB	2	1	4	11.6	15.4
AC	2	1	2	9.9	27
AD	6	4	4	29.1	44.8
BB	3	3	2	16.7	23.1
CA	2	1	2	9.1	18.5
CB	4	4	2	23.3	51.4
DA	3	2	2	14.1	15.9
DB	3	2	2	14.1	36.8
AC (Commercial)	1	1	2	11.6	*
DA (Commercial)	1	1			*
Totals	33	25	24	167.8	273.9

2.1.19 Table 2.4 also shows the area provided in each of the stores. The bin stores provide sufficient capacity to accommodate the bins and also allow circulation of the bins within them throughout the development.

2.1.20 Figure 2.2 and Figure 2.3 show the indicative location of each bin within the respective stores.

Figure 2.2: Eurobin and Food Waste Bin Viewports: Stores in Cores AA/AB/AC/AD

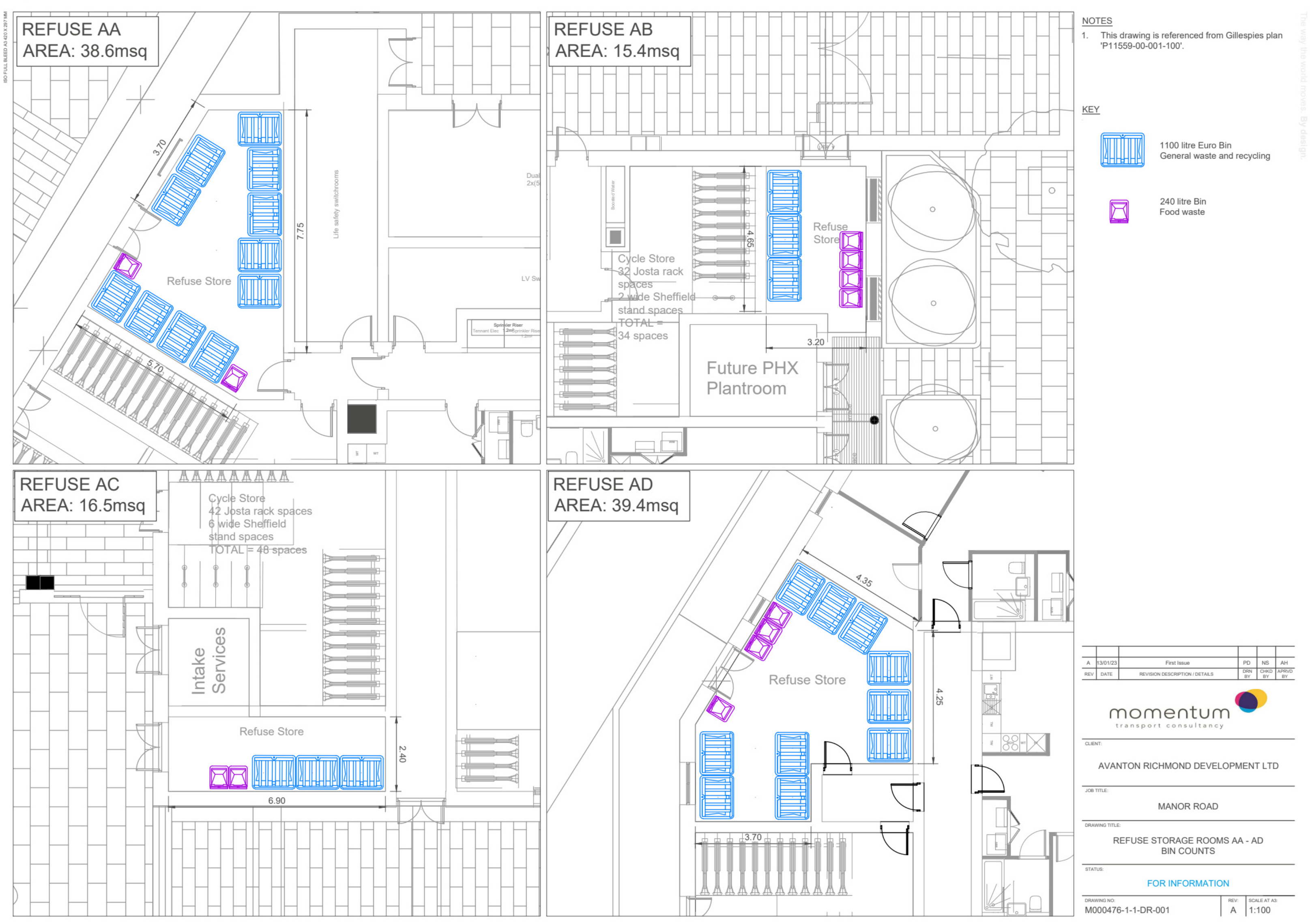


Figure 2.3: Eurobin and Food Waste Bin Viewports: Cores BB/CA/CB/DA/DB

2.2 Waste Collection Strategy

2.2.1 The relocation of the waste storage areas, as well as the food waste storage requirements, require the waste collection strategy to be revisited and updated.

2.2.2 To ensure that every store has spare capacity for the disposal of waste, facilities management will manually monitor and move bins to different stores as and when required. This will form a part of the occupant’s management strategy.

2.2.3 On collection days, it is proposed that the facilities management team(s) on site manually move the bins from cores AB, AC, DA and DB to a holding area close to the perimeter route and adjacent to Block BB, as shown Figure 2.5. This avoids bins being moved or collected along Manor Road.

2.2.4 All other bins will be collected by the refuse collection team by accessing the site’s various stores.

2.2.5 The refuse vehicle(s) would stop a total of four times to collect bins:

- Core AA bins would be collected adjacent to the building's refuse storage entrance
- Core AD bins would be collected adjacent to the building’s refuse storage entrance
- The refuse vehicle would pull into the space between Cores BB and AD, to collect bins from cores AB, AC, BB, DA and DB.
- The outstanding bins from cores CA and CB would then be collected before the vehicle completes its three-point turn and returns to the main carriageway using the same perimeter route.

2.2.6 All bins will be held within 20m of the pick-up spots and refuse vehicles using the perimeter route will not need to reverse more than 12m.

2.2.7 Waste collection vehicles would not need to pass through the centre of the site. Instead, all collection under this strategy will be possible from the perimeter route around the site.

2.2.8 When the waste has been collected, the facilities management team(s) on site will then move the bins back to their storage facilities in the respective cores as shown in the diagram in Figure 2.5.

2.2.9 Emergency vehicles can use both the perimeter route or the shared surface running through the site. Therefore, in the event that the perimeter road is blocked by a refuse collection vehicle, the shared surface would be used by the emergency service vehicles to route into the site. The service route and shared surfaces are to be designed to accommodate an appropriate emergency vehicle specification such that a 40T fire vehicle, as well as a fully-laden refuse collection vehicle could manoeuvre on these surfaces.

Figure 2.4: Indicative Vehicle Routes

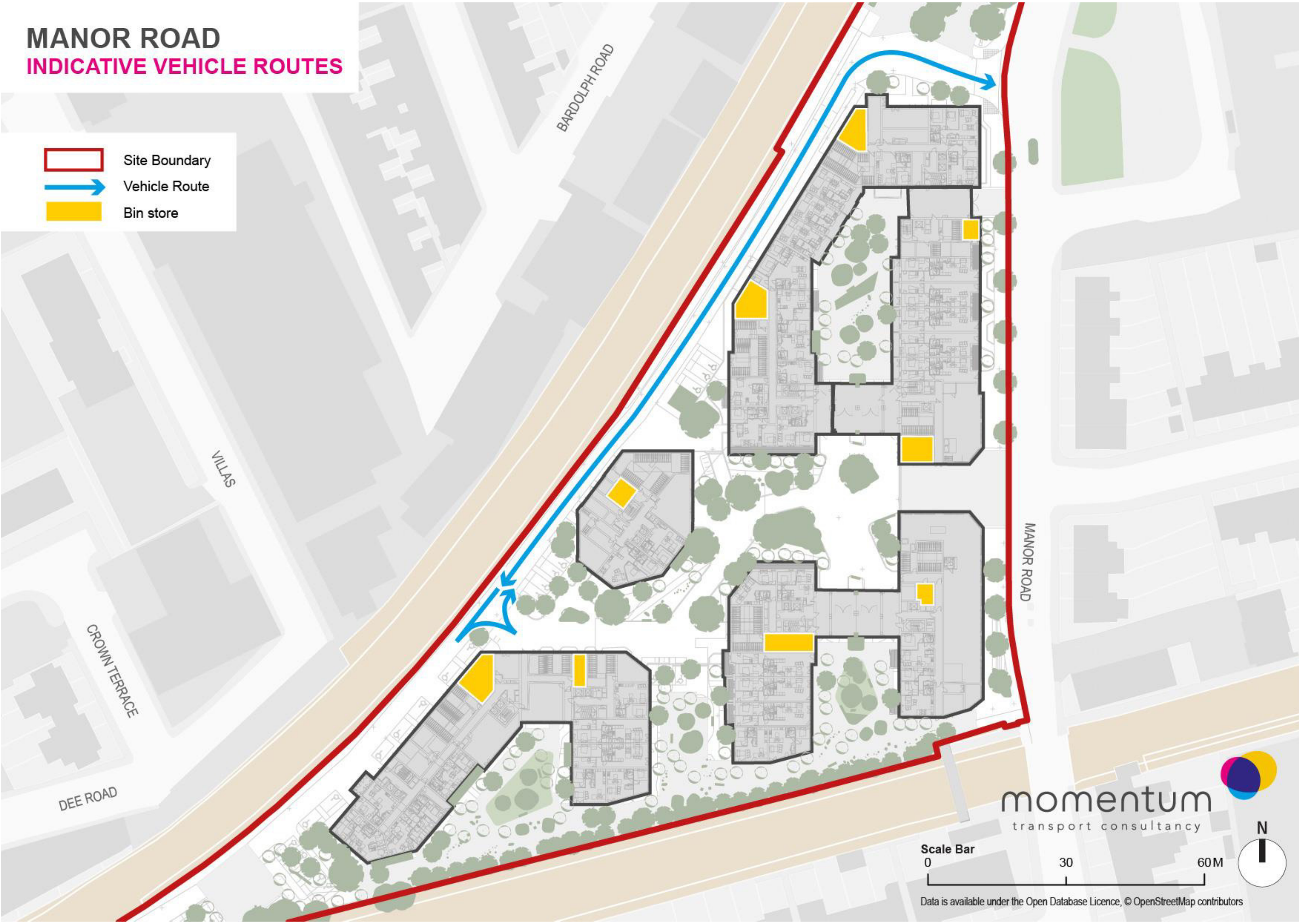
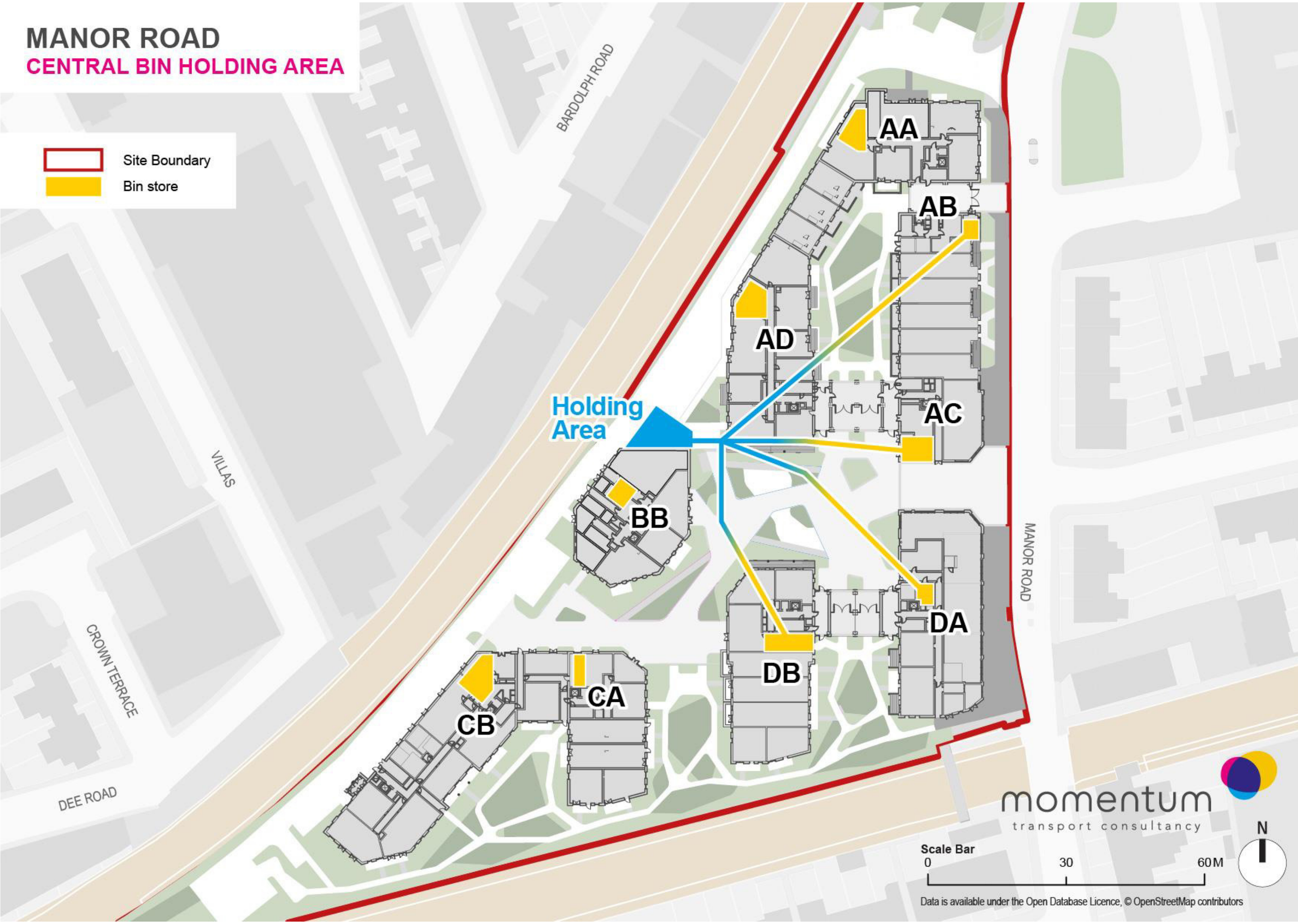


Figure 2.5: Indicative Movement of Bins to Holding Area



2.3 Swept Path Analysis

2.3.1 As demonstrated, vehicles will route into and out of the site via the northern entrance to the access route, from Manor Road. They would stop to the north of the site on the perimeter route to collect bins from Core AA, then proceed along the western perimeter route and stop adjacent to the store in core AD. From there, it will proceed to the central holding area to collect the majority of the site's waste, before continuing to the southwest of the site to collect the remaining bins before turning around and using the same perimeter route to exit back onto Manor Road.

2.3.2 The Swept Path Analysis is presented in order to demonstrate that a refuse collection vehicle could feasibly use the perimeter route and undertake the collections as recommended in the strategy. It also demonstrates the possibility of vehicles being able to successfully complete the turn(s) required as part of the collection strategy.

2.3.3 For the vehicle tracking shown in Figure 2.6, the vehicle used is a Phoenix 2-23W with Elite 2 6x2MS chassis. The specification for this vehicle is shown in Table 2.5, and reproduced on the drawing in Figure 2.6.

Table 2.5: Phoenix 2-23W Vehicle Specification

Item Measured	Measure
Length	10.42m
Width	2.53m
Height	3.21m
Minimum Body Ground Clearance	0.416m
Track Width	2.53m
Lock to lock time	4 seconds
Kerb to kerb turning radius	11.15m

2.3.4 The vehicle will travel for the most part in forward gear. The only occasion on which it will need to travel in reverse gear is to the south, when completing the turn.

2.3.5 The vehicle tracking is shown in Figure 2.6.

Figure 2.6: Swept Path Analysis

3. CONCLUSION

3.1.1 This Revised Waste Strategy Addendum has been prepared by Momentum Transport Consultancy on behalf of Avanton Richmond Development Ltd to update how waste will be collected, stored and removed in a sustainable and efficient way following the redevelopment of Manor Road, North Sheen, Richmond.

3.1.2 A total of 58 x 1,100 litre Eurobins and 24 x 240L bins for food waste are proposed to be provided within the development. The waste forecast by the proposed development equates to 129,262L per week, and would therefore require a total of 155 bins (108 1100L and 47 240L) if collections were undertaken solely by the LBRuT refuse collection team. As described throughout this report, it is proposed to undertake twice weekly collections, with the client committed to obtaining a private contractor for at least one of those collections. therefore, the provision of a total of 82 bins provides enough waste capacity when based on a half-weekly uncompacted output.

3.1.3 The proposed amendments to the design of the scheme will not impact the waste strategy submitted previously and are acceptable in waste strategy terms.

11.4 Sustainable Procurement Plan

Sustainable Procurement Plan

Avanton Ltd

24th January 2019

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1. Introduction

As a responsible developer, Avanton take building sustainably seriously. This report will outline the benchmarks we expect our construction partners and the entire supply chain to meet regarding sustainable development and best practice.

2. Ensuring Sustainable Procurement & Development

2.1. Summary

The below information covers a variety of procedures, benchmarks and levels that Avanton require building materials and contractors to adhere to.

2.2. Carbon

Avanton aim to reduce their carbon emissions and we are relying on all the companies we work with to get on board and commit to reducing their carbon emissions. To do this we have outlined to reduce our supply chain emissions. It is important to effectively manage construction and transportation methods to reduce emissions, for example, by accurately forecasting the amount of materials needed, using larger pack sizes to reduce the amount of packaging per unit and by using cardboard packaging instead of plastic where possible. Carbon should be considered along every stage of the supply chain.

Information regarding the specifications and quantities of materials should be returned within the tendered documentation with evidence.

In order to be as sustainable as possible we want to avoid the following where reasonable to do so:

- Virgin aggregates
- Anodised metals
- Crude-oil derived products
- Steel produced in traditional furnaces
- Stone and heavy materials manufactured outside the EU

Instead we prefer to use:

- High recycled content and post-consumer reclaimed materials
- Renewable materials
- Steel produced in electric arc furnace
- Where possible, regional materials

2.3. Responsible Sourcing of Materials

It is Avanton's aim to source construction products from ethical and sustainable sources. As the construction supply chain can become fragmented and transient, we work to guidelines to manage who we work with and the materials used at every level. We use the BREEAM guidelines as a measure of our success.

Designers and contractors must follow the RICS deleterious materials guidelines and ban the following materials from our designs and construction sites:

- Alkali aggregate reactions
- Asbestos
- Calcium silicate brickwork
- Chlorides
- Composite panels
- Formaldehyde
- High alumina cement concrete

- Hollow clay pot floors
- Lead in plumbing and paintwork
- Nickel sulphides
- RAAC planks
- Sea-dredged aggregates
- Tesserae
- Vermiculite
- Volatile Organic Compounds
- Woodwool slabs

All timber and timber-based products used to build our developments are to be legally harvested and traded timber as per the UK Government's Timber Procurement Policy (TTP).

3. Supply Chain Management

3.1. Summary

In order to be as sustainable as possible Avanton require each contractor to be responsible for their supply chain. They must be managed and recorded to ensure our best practice is being followed and achieved.

3.2. Supply Chain Requirements

- Companies must have a full relevant and up to date environmental policy
- Share information as and when reasonably required
- Ensure all materials comply with relevant legislation
- Adhere to the provisions of the UN Global Compact Principles regarding human rights, labour standards, the environment and anti-corruption
- Not use deleterious materials or environmentally harmful practices where a reasonable alternative is possible
- Adhere to industry standard payment terms & not unreasonably withhold payments to suppliers

Those companies that do comply with the below will be given preference during the tendering process:

- Give preference to locally sourced materials and provided opportunities to small and medium sized enterprises
- Invest in local communities we are working in and help to reduce emissions associated with vehicle movements to our sites
- Provide life cycle costings
- Are active members of the Supply Chain Management School
- Using products that are working towards the adoption of Environment Product Declarations
- Use products from a recognised responsible sourcing scheme
- Showcase innovation and industry best practice

4. Modern Slavery Policy

4.1. Summary

Avanton have a zero-tolerance policy with regards to modern slavery. We expect our contractors, consultants and supply chain to hold accurate, up to date employee records to mitigate against modern slavery. The Global Slavery Index shows that certain countries have substantial risk of slavery in manufacturing so when we materials are imported from outside the UK we will engage with each supplier to ensure our expectations are met throughout the supply chain. This can be checked against fair pay and labour standard using tools such as SEDEX & EcoVardis.

5. Construction Material preferences

5.1. Summary

At Avanton we aim to develop high quality schemes using sustainable construction materials where possible.

The below table shows requirements we prefer along the supply chain.

Category	Material	Requirement
Bulk Materials	In situ concrete Precast concrete Structural metals Cladding metals Engineering bricks Facing bricks Other ceramics	BES6001preferred ISO14001 required
Structural timber	Structural timber including glulam, cross laminated timber	FSC or PEFC certified
Other wood materials	Non-structural timber, timber composite and wood panels including plywood, oriented strand board, medium density fibreboard (MDF). Chipboard and cement bonded particleboard	FSC certified
Other wood materials	Hardwoods	Must be FSC with full chain of custody
Other materials	Stone and gravel, including dressed and building stone Gypsum Cementitious materials: mortars, plasterboard, plaster, cementitious renders Glass Bituminous materials, including membranes and asphalt Plastics, polymers and rubbers Pavers including concrete and clay	BES6001 preferred IS014001 required
Insulation	Fabric insulation Building services insulation	ISO14001 required
Deleterious materials	Substances on the REACH substances of Very High Concern (SVHC) list, and: Alkali aggregate reactions (AAR & ASR) Asbestos Calcium silicate brickwork Chlorides Formaldehyde	Not permitted

	High alumina cement concrete Hollow clay pot floors Lead in plumbing and paintwork Nickel sulphides RAAC planks Sea-dredged aggregates Tesserae Vermiculite VOC's Woodwool slabs	

6. How we measure success

- Procurement of materials will be regularly monitored & reported on monthly by the relevant contractor
- Employment and supply chain management to be reported monthly by the contractor.
- Contractors expected to sign up to sustainability schemes.