Chapter 3

Approach to New Development

3.1 Circular Economy Approach

3.1.1 General

The Circular Economy decision tree for design approaches for new buildings described in the GLA Circular Economy Statement Guidance has been used to assist the design team in choosing the most appropriate design approach for the new buildings.

Starting with this decision tree, this Section sets out the Circular Economy design approach for the new buildings. This is followed by an explanation of the relevant Circular Economy design principles by building layer, and how these principles are embedded within the Proposed Development.

Since the strategic approaches and many of the design principles are common, this Section is split according to the following:

- **Commercial building (see Figure 3.1)**
  - One Museum Street
- **Residential buildings (see Figure 3.1)**
  - West Central Street
  - Vine Lane
  - High Holborn.

Finally the bill of materials and reporting is presented on a site-wide basis, commensurate with the GLA Circular Economy Statement Template.

Diagram Showing Proposed Commercial and Residential Buildings

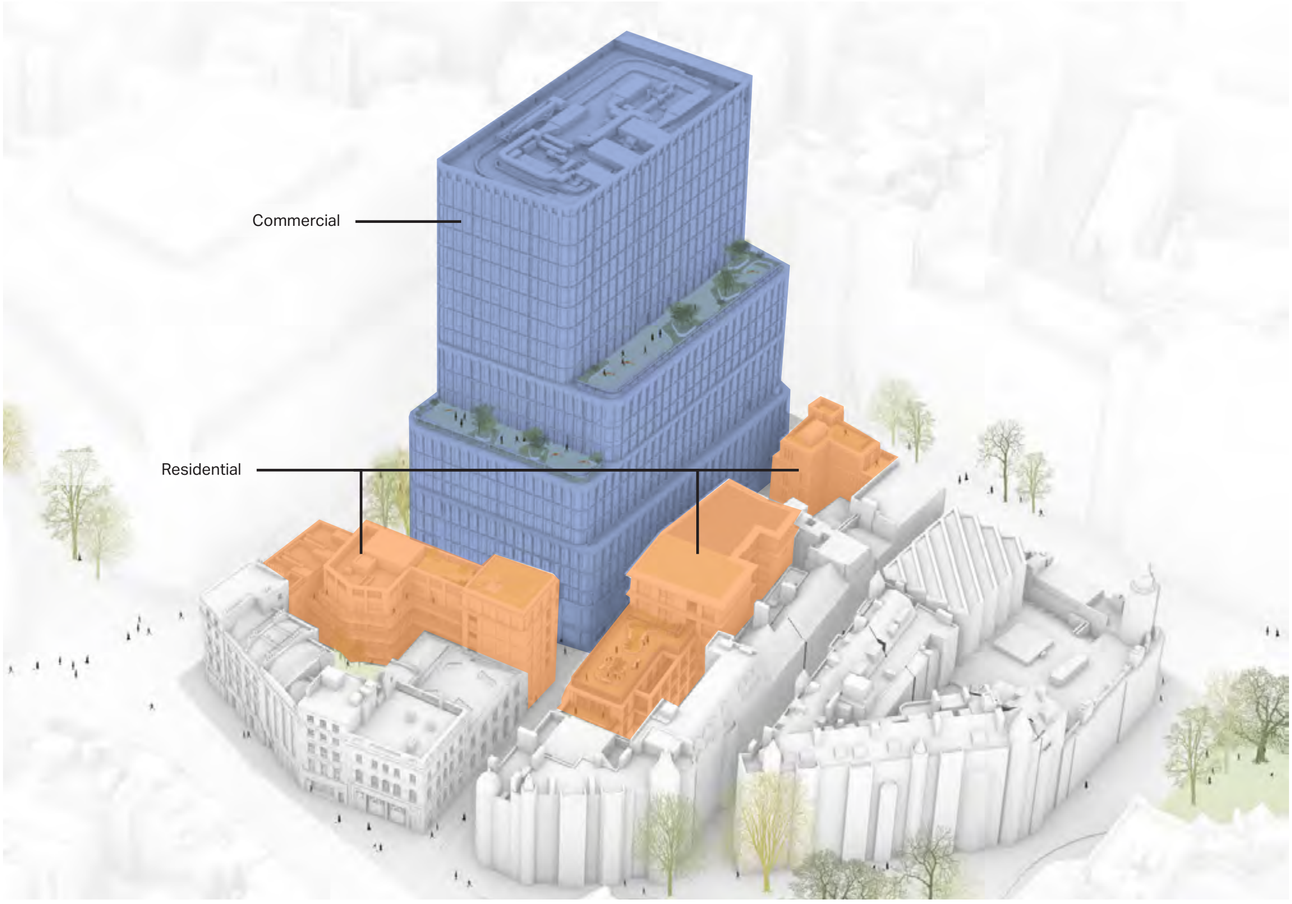


Figure 3.1 Diagram showing proposed commercial and residential buildings

3.1.2 Design Principles by Building Layers

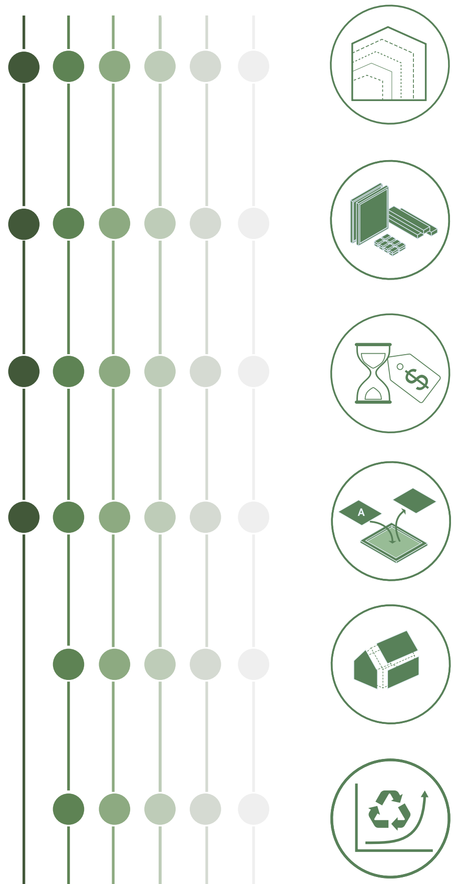
The Circular Economy design principles are considered across all building layers for both commercial and residential buildings, as shown in Figure 3.2.

Building in Layers
The Proposed Development has been designed using the “Building in Layers” framework. This means each layer is considered with its own life-cycle, and to support reuse and recycling, different building layers are independent, accessible, and removable while maintaining value, where possible.

Structure & facade
To support this, the structure and facade are designed to be independent such that a facade replacement can be achieved without damaging the structure.

Services
All MEP systems can be removed and replaced without impacting the other building layers, while generally being exposed for accessibility.

Space planning
Similarly, all space planning can be removed and replaced without impacting the other building layers.



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, reuse of buildings, secondary products and materials.

Designing for longevity

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

Designing for adaptability or flexibility

Designing with thought of how a building would be easily altered to prolong its life, including easy rearrangement of internal fit-out and arrangement to suit the changing needs of occupants.

Designing for disassembly

Designed to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling. If designed well, it should be possible to replace any component.

Using materials that can be reused and recycled

The use of a product in its original form with minimal reprocessing. Preparation for reuse involves checking, cleaning or repairing materials so that they can be used again for their original purpose.

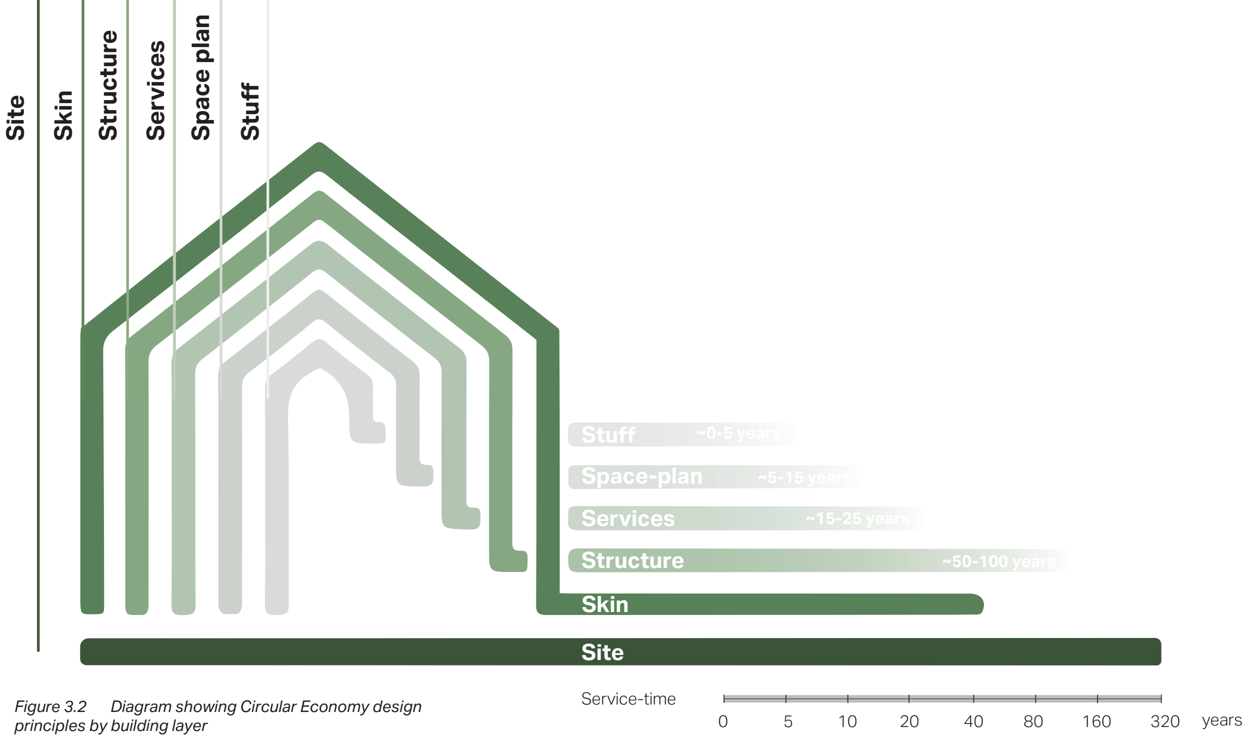


Figure 3.2 Diagram showing Circular Economy design principles by building layer


SHAFTESBURY
&Juliet
#AndJuliet
The most famous love story of all time. Remixed.
#RomeoWho

Figure 3.3 Render of the proposed development (DSDHA)

3.2 Commercial Building

3.2.1 Overview

This Section sets out the Circular Economy approach and design principles for the commercial building on the site, One Museum Street. It steps through each of the Circular Economy design principles and outlines how these principles are embedded within the relevant building layers in the Proposed Development (see 3.1.2).

One Museum Street forms the key component of the overall masterplan as a G+18 storey commercial-led building. The design features an architectural approach that is responsive to the context and architectural heritage of Bloomsbury.

The Proposed Development aims to create a building of coherence in a rich and varied historical context, while allowing for future change of use and adaptation to future needs.

The Circular Economy decision tree for design approaches for new buildings described in the GLA Circular Economy Statement Guidance has been used to assist the design team in choosing the most appropriate design approach for One Museum Street and its respective building layers. Refer to Figure 3.4.

Circular Economy Design Approaches for New Buildings	Response
Is the whole building designed to have a short life on its current site? (E.g. less than 10 years)	No
Is it foreseeable that the building will need to change use/function within its design life?	No

As outlined in Section 1.4, the new building aims to deliver a long-lasting tower that maximises its life-cycle. This means simultaneously responding to today's demands, and flexing and adapting to remain fit for purpose into the future. This has particular importance for the structure, facade, and MEP as the most carbon-intensive of the building elements. It is also clear, that a long-lasting tower is predicated on the longevity the structure, therefore the principles for longevity and adaptability are particularly impactful in the structure.

The strategies in the design to enable this include:

- A steel-framed structure with high potential for adaptability and disassembly
- Structural loading capacity that supports several use cases including residential, hotel, or student accommodation
- A soft-spot strategy to allow tenants to knock through floorplate for vertical connectivity
- Spatial flexibility through a generous structural grid, centralised core, generous floor to floor height, and standard facade grid
- A modular facade designed for off-site manufacturing enabling waste reduction
- A facade designed for re-glazing independently from the framing
- An internal space plan that can host a multitude of different tenants and user requirements.

GLA Circular Economy Decision Tree for New Buildings

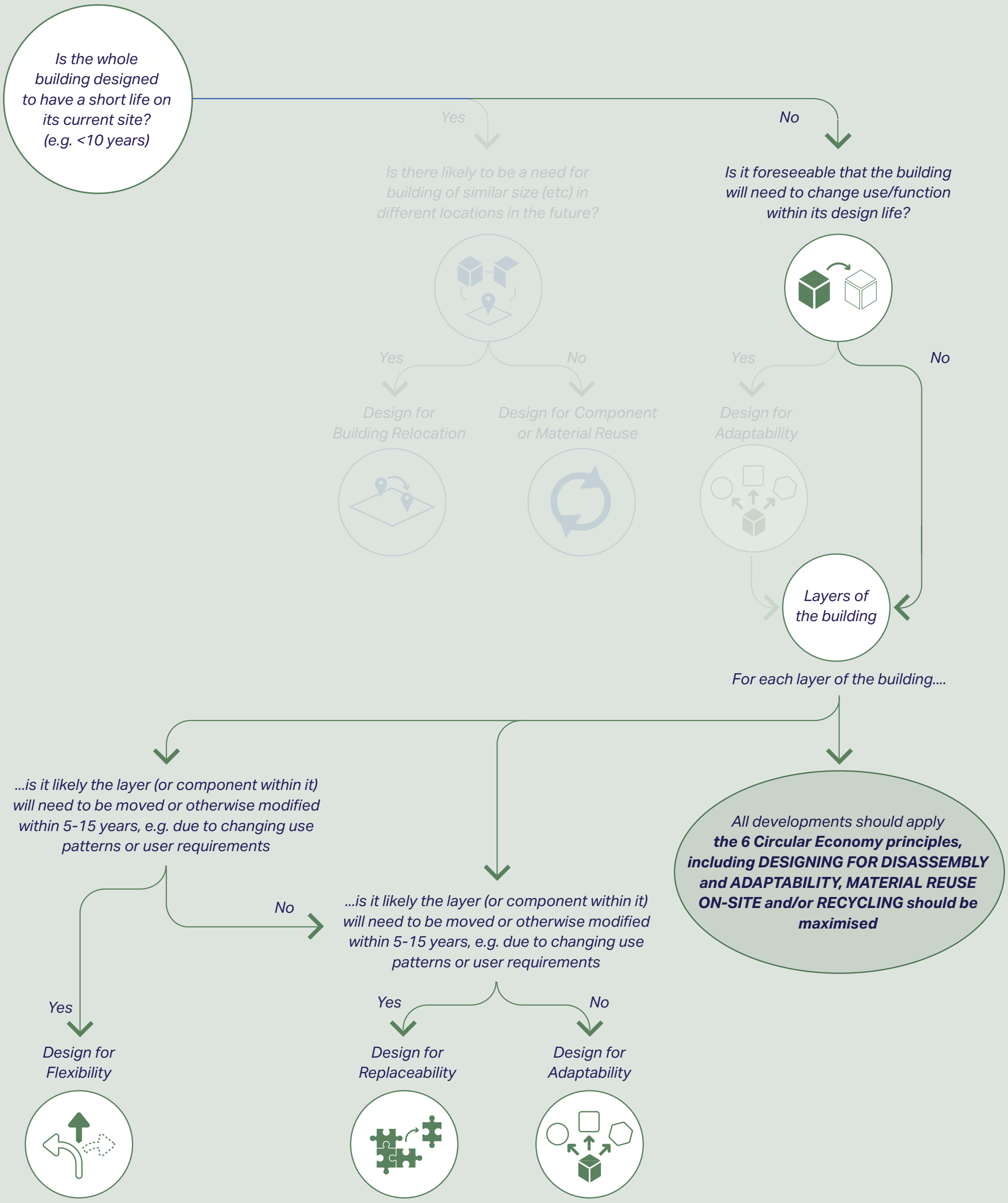


Figure 3.4 GLA Circular Economy Decision Tree for New Buildings applied to One Museum Street

Designing out Waste

The principle of "Designing out Waste" is applied to all building layers in the Proposed Development. It also covers all stages of the building's life-cycle. For the site, substructure, and superstructure, the effort lies in designing out waste at production and construction (though it is inherently considered in structural adaptability), whereas for the services, facade, and space planning, the in-use waste is equally addressed.

Key targets for this principle are:

- Diversion from landfill
  - Demolition waste 98%
  - Construction waste 95%
  - Excavation waste 95%
- Waste generation
  - Targeting a limit of 7.5m³ or 6.5 tonnes/100m² GIA for non-residential construction waste.

Substructure

The existing foundation and basement will be retained in the Proposed Development so far as possible, and the extent of new basement minimised. This will significantly reduce the amount of new material required for the substructure, as well as the amount of deconstruction waste.

Concrete products and masonry (various) will be crushed (potentially on-site), and reused on site where applicable as piling mat or fill for basement areas.

New concrete will use waste products (e.g. GGBS) as cement replacement, where applicable.

All reinforcement bar will contain high proportions of recycled content (ca. 97% recycled content).

The foundation and basement in the redevelopment are expected to last beyond the lifespan of the Proposed Development. This unlocks the potential for repeated retention, with benefits beyond the system boundary.

Superstructure

Current investigations into reuse of sawn concrete elements for reuse as a means of reducing waste and virgin material demand. Refer to Section 2.5.4.

Concrete products and masonry (various) will be crushed (potentially on-site), and reused on site where applicable as piling mat or fill for basement areas.

The proposed superstructure is designed as a steel-framed structure, with a focus on rationalisation and material use reduction. The relatively lightweight steel construction minimises loads on the existing foundations.

New concrete will use waste products (e.g. GGBS) as cement replacement, where applicable.

All reinforcement bar will contain high proportions of recycled content (ca. 97% recycled content).

Procurement of reused structural steel will be sought, where appropriate, and subject to availability of supply.

Structure includes a soft spot strategy, enabling occupiers to knock through floorplates for vertical circulation, if desired while minimising waste generated.

The steel frame will be recoverable at end of life, to feed the reused steel market, providing benefits beyond the system boundary.

Facade

Current investigations into closed-loop recycling of building glass, as a means of reducing waste and virgin material demand. Refer to Section 2.5.5.

The facade is designed with standard dimensions and modularity, to enable off-site pre-fabrication of repetitive elements. This minimises construction waste, as well as improves health and safety on site.

New aluminium profiles in the facade will contain ca. 30% recycled content.

These standardised facade components will aid in-use upgrades and potential reuse. The facade system is designed to allow for re-glazing without having to replace the framing or cladding, which should outlast the insulated glazing units.

The facade system is designed with mechanical fasteners between elements, and bolted connections to the structure to minimise waste during adaptation or deconstruction. This optimises the potential for future reuse and recycling.

The current facade design incorporates aluminium frames, aluminium cladding, and glass at the upper levels, and granite cladding the ground level. All of these materials have high potential for reuse or recycling.

Services
The HVAC strategy using variable air volume (VAV) boxes for fresh air ventilation, with local fan coil units (FCUs) for heating and cooling. These are standardised components, fabricated off-site which minimises construction waste, as well as improves health and safety on site. "Systems have been modularised as far as practicable allowing for repair or replacement of individual components on an ongoing basis."

Power and data is distributed in an accessible, raised access floor, enabling changeable layouts without generating services waste where power and data runs are reconfigured.

Soffits are designed to be visible, enabling exposed services to ease access for removal and replacements of the high-level services.

Plant replacement has been considered without impacting the other building layers. On the floors, all services equipment can be replaced via the goods lifts. Rooftop plant is replaceable using the BMU, and basement plant is replaceable by using the goods lift or the loading bay vehicle lift (where necessary).

Space planning
Floorplates are designed with generous structural grids and a standardised planning grid. This allows a variety of uses and users, and enables occupiers to fit-out spaces using standardised systems and components.

Floorplates are designed to accommodate single or multi-tenant splits, refer to the DAS.

The Proposed Development is designed to "shell & core" and two floors only as Cat A (in line with cost plan and WLCA) to minimise waste associated with fit-outs.

Space planning includes a soft spot strategy, enabling allow occupiers to knock through floorplates for vertical circulation, if desired while minimising waste generated.

Procurement of reused raised access floor will be sought, where appropriate, and subject to availability of supply.

In highly trafficked areas, such as lobbies, publicly available space, and amenity spaces there will be an enhanced focus on robust and durable materials.

To help reduce operational waste, suitably sized, dedicated, and labelled space for storing/segregating recyclable waste is allowed for within the Proposed Development.

For material/product specifications, early engagement with the supply chains will be sought to mitigate procurement risks so far as possible.

Stuff
Limited applicability to shell & core design. Specifications to be considered during procurement.

Designing for Longevity

The principle of “Designing for Longevity” is a key principle for the Proposed Development, and is informed by the learnings from the Pre-Redevelopment Audit, refer to Section 2.2.

Design considerations have been focused on the building layers that have an impact on the long-term functionality of the building (the structure, facade, and MEP), and which contribute to most to the whole life-cycle embodied carbon.

Substructure

The existing foundation and basement, so far as possible, are being retained in the Proposed Development. New areas of substructure will be designed using reinforced concrete which is a durable material, and expected to last beyond the Proposed Development’s service life.

Superstructure

The superstructure in the Proposed Development comprises a steel frame with concrete decks. Both steel and concrete are durable materials, and if maintained properly, would be expected to last beyond the Proposed Development’s service life.

Beyond materiality, in order to plan for longevity (due to flexibility of the space), the superstructure is designed with the following parameters:

- Minimal internal columns
- A centralised core at the lower levels with an offset core at the upper levels, always giving leasing spans of 9-10m
- Floor to floor heights that deliver at least 2.725m clear floor to ceiling, suitable for a range of uses and users
- A soft spot strategy enabling occupiers to knock through floorplates for vertical circulation.

Facade

Facade materials will be specified with a focus on durability e.g. aluminium is currently considered as a durable solution for the main facade cladding. Different facade elements have different lifespans and it should be possible to replace or repair shorter lifespan elements (e.g. re-glazing of insulated glazing units) in-situ to extend the overall lifespan of the facade.

The facade module is designed using a standardised planning grid.

Operable panels are allowed for it the design to augment the scheme’s cooling strategy. The inclusion of operable panels should future-proof the facade design and therefore improve its longevity.

Services

Building services generally have a shorter lifespan than the structure and the facade, both due to durability of materials and systems, but also due to technical and regulatory development which may require upgrades to systems.

To optimise the longevity of the building services in the Proposed Development, accessibility to aid maintenance and replacement of certain components is promoted. This is achieved through a soffit design that allows for exposed services, an accessible, raised access floor, and adequate maintenance space in plant rooms.

The longevity of the overall systems is also being considered. The ventilation system is designed with fresh air rates exceeding statutory requirements, thereby including capacity for future change of use or need.
The heating and cooling systems, as well as stormwater drainage, are designed with an allowance for future climate change.

Systems have also been designed to be manufacturer independent as far as practicable, allowing for future component replacement & upgrades without being tied to a single source of supply or being required to replace proprietary distribution infrastructure.”

Space planning
The longevity of the space planning is contingent on the same considerations as that of the superstructure, with the addition of:

- Facade module on a standardised planning grid.

In highly trafficked areas, such as lobbies, publicly accessible space, and amenity spaces, there will be an enhanced focus on robust and durable materials. Likewise, in the design of the public realm there is a focus on selecting materials with high durability. Currently granite cladding and granite setts are proposed for these areas at the base of the building for its durability.

Stuff
Limited applicability to shell & core design. Specifications to be considered during procurement.

Designing for Adaptability or Flexibility
The principles of designing for adaptability or flexibility have been applied to multiple layers of the Proposed Development, and are key drivers to ensure that the building is fit for purpose and can be easily adapted to prevent premature obsolescence.

In this Section, the definitions in the GLA's Circular Economy Guidance, Table 3 are followed. Adaptability typically relates more to building structural changes, and flexibility relates to floorplates rather than structural changes.

The Proposed Development is design to accommodate various uses and users. As a scenario, a feasibility study has been conducted, showing a possible future residential layout. Refer to Appendix I.

Substructure
Limited adaptability applicable to substructure, however as shown in the Pre-Redevelopment Audit (Section 2.2), it is possible to adapt existing substructures to suit a new above ground structure.

Superstructure
As noted under "Designing for Longevity", the superstructure is designed with the following parameters:
- Minimal internal columns
- A centralised core at the lower levels with an offset core at the upper levels, always giving leasing spans of 9-10m
- Floor to floor heights that deliver at least 2.725m clear floor to ceiling, suitable for a range of uses and users
- A soft spot strategy enabling occupiers to knock through floorplates for vertical circulation.

In addition, the superstructure is designed with structural loading capacity to accommodate 1:8 occupancy for the typical levels, and 1:6 occupancy for certain levels. The loading capacity could support several use cases including residential, hotel, or student accommodation, enabling a future change of use.

The Proposed Development is not anticipated to grow significantly vertically or horizontally, as it is sized to suit its context. Expansion on the Level 08 and Level 11 terraces could be possible future, in order to enable more indoor space, and the superstructure design has loading capacity to accommodate this scenario.

Facade
The facade design uses two primary passive strategies to ensure it is adaptable to a changing climate:
- The facade depth and articulation are driven by mitigating excessive solar heat gains
- Operable panels are used in order to reduce cooling demand.

As noted under "Designing out Waste", the facade system is designed to allow for re-glazing without having to replace the framing or cladding. This means the solar and daylighting performance could be adapted by replacing the glazing units only, without impacting the framing or cladding.

Services
As noted under "Designing for Longevity", the ventilation system provides flexibility for future changing requirements with fresh air rates exceeding statutory requirements. The heating and cooling systems, as well as stormwater drainage, are designed with an allowance for future climate change, making them adaptable to a changing climate.

The variable air volume (VAV) ventilation system uses VAV boxes at every level. This ensures the ventilation system can adapt the fresh air provision at each floor to follow the respective floor's occupancy level.

Spatial flexibility is inherent with the proposed HVAC strategy of VAV boxes for fresh air ventilation, with local fan coil units (FCUs), as well as the raised access floor for power and data. This strategy enables repositioning to suit changing interior fit-outs without significant waste.

As noted under "Designing out Waste", the following strategies also improve adaptability or flexibility:
- Exposed services to ease access for removal and replacements of the high-level services
- On-floor services replacement via the goods lifts
- Rooftop plant replaceable using the BMU
- Basement plant replaceable by using the goods lift or the loading bay vehicle lift (where necessary).

Space planning
As noted under “Designing out Waste”, the space plan is designed with the following parameters to improve flexibility:

- Generous structural grids and a standardised planning grid
- Accommodation of single or multi-tenant splits, refer to the DAS
- A soft spot strategy, enabling occupiers to knock through floorplates for vertical circulation.

Additionally, the following parameters improve space planning flexibility, as noted under “Superstructure” in this Section:

- Clear floor to ceiling heights of at least 2.725m are suitable for a range of uses and users
- Consistent leasing spans in the range 9-10m
- Accommodation of occupancy levels at lower (1:8) and higher (1:6) densities.

Stuff
Limited applicability to shell & core design. Specifications to be considered during procurement.

Designing for Disassembly
The principle of designing for disassembly is considered across all relevant layers in the Proposed Development.

Substructure
Generally not applicable to substructures.

Superstructure
As noted under "Building in Layers", the proposed superstructure and facade are designed to be independent of each other. This means that at the facade's end of life, it can be removed without damaging the superstructure such that the steel frame can be later recovered for reuse or recycling.

Where soft-spots are proposed in the superstructure, approaches to install these in such a way that they can be later removed and recovered will be investigated.

Facade
The proposed facade is predominantly of a "unitised" curtain wall construction. As noted under "Designing out Waste", it is designed with mechanical fasteners between units, and bolted connections to the structure to minimise waste during adaptation or deconstruction. This enables disassembly of the facade units themselves, as well as from the superstructure.

Services
As noted under "Designing out Waste", the following strategies for services allow for disassembly with no/minimal damage to respective components, and without impacting the remaining building layers:

- Localised variable air volume (VAV) boxes for fresh air ventilation, with local fan coil units (FCUs) on every level
- Exposed services to ease access for removal and replacements of the high-level services
- Power and data distribution via a raised access floor
- On-floor services replacement via the goods lifts
- Rooftop plant replaceable using the BMU
- Basement plant replaceable by using the goods lift or the loading bay vehicle lift (where necessary).

In limited areas where ceilings are proposed, demountable panels will provide access to any equipment subject to frequent maintenance and/or replacement.

Space planning
As noted under "Designing for Adaptability or Flexibility", the space plan has been designed with several strategies to aid flexibility.

For the limited areas of landlord-controlled fit out, the use of mechanical connections in lieu of adhesives for partition systems will be prioritised, where technically, practically, and commercially feasible. Similarly finishes will seek to use mechanical connections/jointing systems, such that they can be disassembled without damage to themselves or the relevant substrates.

Stuff
Limited applicability to shell & core design. Specifications to be considered during procurement.

Using Materials That Can be Reused and Recycled
Wherever it is technically, practically, and commercially feasible, the Proposed Development will prioritise the use of reusable and/or recyclable materials. Early engagement with the supply chains will be sought to mitigate procurement risks so far as possible.

Substructure
Generally not applicable to substructures. However end of life reinforced concrete can be crushed for secondary uses, with reinforcement separated for closed-loop recycling.

Superstructure
As noted under "Designing out Waste", the proposed superstructure is designed as a steel-framed structure. The steel frame will be recoverable at end of life, to feed the reused steel market, or recycling, providing benefits beyond the system boundary.

For the concrete decks, current best practice is to crush concrete for secondary uses, with reinforcement separated for closed-loop recycling. However as noted in Section 2.5.4, the Proposed Development continues to investigate the feasibility of novel ways of reusing concrete, and it is possible that such methods are more widely adopted by the time the concrete reaches end of life stage.

Facade
As noted under "Designing out Waste", the current facade design incorporates aluminium frames, aluminium cladding, and glass at the upper levels, and granite cladding the ground level. All of these materials have high potential for reuse or recycling.

Services
As noted under "Designing for Disassembly", most of the major services equipment can be disassembled/removed with incurring no/minimal damage. This means that, where the relevant capability exists, equipment can be refurbished for reuse.

Equipment that is metallic and homogeneous (e.g. sheet ductwork, cable trays, etc.), have high potential for recycling.

Space planning
For the limited areas of landlord-controlled fit out, where technically, practically, and commercially feasible, products/finishes will be sought that can be reused/recycled (e.g. raised access flooring, partition and ceiling systems, floor finishes, and the like).

Stuff
For the limited areas of landlord-controlled fit-out, loose furniture, appliances, etc., within the Proposed Development, products that can be carefully removed from site and either offered to local charities, or community groups or sold on directly to third parties at end of life will be prioritised. Where furniture is unable to be sold on it can disassembled into its material parts and recycled through manufacturer closed loop recycling schemes, where appropriate, or via registered recycling contractors.


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Figure 3.5 Render of the proposed development (DSDHA)

3.3 Residential Buildings

3.3.1 Overview

This Section sets out the Circular Economy approach and design principles for the residential buildings on the site. Since the Circular Economy considerations for the new development of the residential buildings is similar, they are considered together in this Section. It steps through each of the Circular Economy design principles and outlines how these principles are embedded within the relevant building layers in the Proposed Development (see 3.1.2).

The intention for the residential buildings is to create a meaningful element of accommodation suitable for residents of varying age groups and social backgrounds, as well as supporting commercial offer in this central location. To this end, the residential buildings in the Proposed Development comprise:

- Vine Lane
  - Single new building rising to 6 storeys, providing market residential units, and a range of flexible uses at ground
- High Holborn
  - Single new building rising to 6 storeys, providing market residential accommodation, and flexible use at ground
- West Central Street
  - A series of new and refurbished buildings rising to 6 storeys providing affordable and market residential accommodation, and flexible use at ground.

Circular Economy Design Approaches for New Buildings	Response
Is the whole building designed to have a short life on its current site? (E.g. less than 10 years)	No
Is it foreseeable that the building will need to change use/function within its design life?	No

The Circular Economy decision tree for design approaches for new buildings described in the GLA Circular Economy Statement Guidance has been used to assist the design team in choosing the most appropriate design approach for the residential buildings and their respective building layers. Refer to Figure 3.6.

As outlined in Section 1.4, like the commercial tower, the new buildings aim maximise their life-cycles. This means simultaneously responding to today's demands, and flexing and adapting to remain fit for purpose into the future. This has particular importance for the structure, facade, and MEP as the most carbon-intensive of the building elements.

The strategies in the design to enable this include:

- Material choices in structure, facade, and finishes that focus on durability and longevity
- Where possible (noting the listed buildings), regular layouts are proposed to enable potential adaptation in the future
- Modular facades designed for off-site manufacturing where possible enabling waste reduction.

GLA Circular Economy Decision Tree for New Buildings

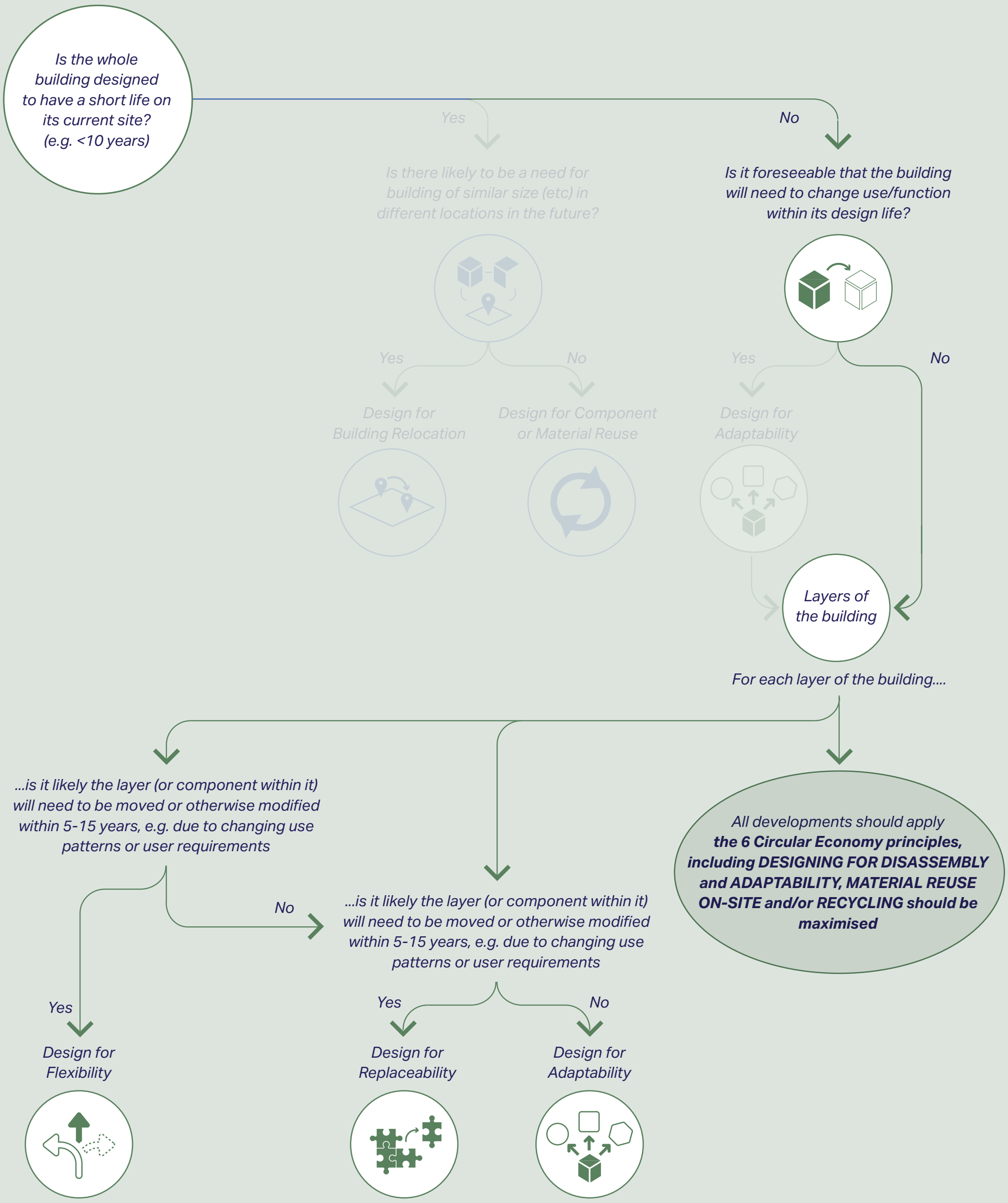


Figure 3.6 GLA Circular Economy Decision Tree for New Buildings applied to the residential buildings

Designing out Waste

The principle of “Designing out Waste” is applied to all building layers in the Proposed Development. It also covers all stages of the buildings’ life-cycles. For the site, substructure, and superstructure, the effort lies in designing out waste at production and construction (though it is inherently considered in structural adaptability), whereas for the services, facade, and space planning, the in-use waste is equally addressed.

Key targets for this principle are:

- Diversion from landfill
  - Demolition waste 98%
  - Construction waste 95%
  - Excavation waste 95%
- Waste generation
  - Targeting a limit of 26.52m^3 or 16.90 tonnes/£100k project value for residential construction waste.

The existing buildings at 10-12 Museum Street and 35-41 New Oxford Street are to be retained and refurbished, significantly reducing the amount of deconstruction waste.

Substructure

For West Central Street, all existing basements will be retained in the Proposed Development. This will significantly reduce the amount of new material required for the substructure, as well as the amount of deconstruction waste.

Material usage will be minimised in the design of the substructure, by designing for high utilisations, and not over estimating design loads.

All other strategies are as per the commercial building, see Section 3.2.

Superstructure

Material usage will be minimised in the design of the superstructure, by designing for high utilisations, and not over estimating design loads.

Where the proposed superstructure is a steel frame, it will be designed with bolted connections to maximise the potential for reuse at end of life, providing benefits beyond the system boundary.
Strategies for new materials are as per the commercial building, see Section 3.2.

<u>Facade</u>
The facades for 10-12 Museum Street and 35-41 New Oxford Street are proposed to be retained, repaired, cleaned, and upgraded as necessary. This will significantly reduce the amount of new material required for the facades, as well as the amount of deconstruction waste.

For more details refer the DAS.

For the new-build facades for 16a-18 West Central Street, the facade is designed with standard dimensions and modularity, to enable off-site pre-fabrication of repetitive elements. This minimises construction waste, as well as improves health and safety on site.

Additionally, these buildings are set out to brick dimensions, to reduce unnecessary off-cuts and brick specials, further reducing construction waste.

The current facade design incorporates aluminium frames, GRC, insulated render (16a West Central Street), brick cladding (16b and 18 West Central Street), and glass. With the exception of insulated render, all of these materials have high potential for reuse or recycling.

For the new-build facades for High Holborn, the facade is designed with standard dimensions and modularity for the same reasons as above.

The current facade design incorporates aluminium frames, GRC cladding, glass, and stone cladding at the base. All of these materials have high potential for reuse or recycling.

For the new-build facades for Vine Lane, the facade is designed with standard dimensions and modularity for the same reasons as above.

The current facade design incorporates aluminium frames, precast concrete cladding, brick-faced GRC cladding to the inset balconies, and glass. All of these materials have high potential for reuse or recycling.

GRC and precast panels could be reused if their shape and size is acceptable suitable for another reciver project.

Across all buildings, new aluminium profiles in the facade will contain ca. 30% recycled content. The use of standardised facade components will aid in-use upgrades and potential reuse. The facade systems are generally designed to allow for re-glazing without having to replace the framing or cladding, which should outlast the insulated glazing units.

Services

16a-18 West Central Street, 35-41 New Oxford Street, Vine Lane, and High Holborn will have independent mechanical ventilation with heat recovery (MVHR).

10-12 Museum Street will not have MVHR, as this is not possible within the constraints of the Listed Building Consent. Instead, background ventilators and intermittent extract fans will be used.

Purge ventilation will be generally via openable windows, excepting Level 01 of the New Oxford Street frontage, where the windows are required to be sealed.

Natural ventilation is generally preferred as a means of reducing potential waste throughout the Proposed Development. Active cooling will only be used where overheating cannot be mitigated naturally as per Part O, and in such cases, will only be used in the specific room affected.

While there is no requirement for active cooling for the entirety of Vine Lane, provision will be made via the site-wide cooling network to enable this flexibility in future.

Both West Central Street and Vine Lane will have heating provided from the site-wide heat network in 1 Musem Street.

High Holborn will use a combined heating, cooling and hot water system to reduce the amount of plant equipment required to serve this building. Each unit will be provided with both heating and cooling. .

Systems have been modularised as far as practical, allowing for repair or replacement of individual components on an ongoing basis. Allowing future provision instead of installing immediate installation, ensures that resources are only utilised as demand necessitates, reducing waste now and in the future.

The site-wide heating and cooling network reduces the need for individual systems, centralising resources to lower the environmental footprint and decrease material use and maintenance requirements across buildings.

Space planning
The space plan for the existing buildings at 10-12 Museum Street and 35-41 New Oxford Street is to be retained.

For Vine Lane, all apartments are designed to meet or exceed modern space standards. Homes are designed to be energy efficient, maximising daylight and natural ventilation and are all dual aspect with private balconies.

For High Holborn, all apartments are designed to meet or exceed modern space standards, with dual aspect apartment.

On West Central Street, the market sales refurbished homes are designed to meet or exceed housing standards where the existing building constraints allow and are all dual aspect. The affordable units are designed to meet or exceed housing standards, are dual aspect and have a shared courtyard.

For all buildings, in highly trafficked areas, such as lobbies, publicly available space, and amenity spaces there will be an enhanced focus on robust and durable materials. This has already been considered in the materiality choices for the facades and finishes, refer to the DAS for more detail.

To help reduce operational waste, suitably sized, dedicated, and labelled space for storing/segregating recyclable waste is allowed for within the Proposed Development.

For material/product specifications, early engagement with the supply chains will be sought to mitigate procurement risks so far as possible.

Stuff
All existing historic features (stairs, partitions, trims, propriety systems, to be retained and repaired (only replaced where not suitable for repair).

Designing for Longevity
The principle of "Designing for Longevity" is a key principle for the Proposed Development. Design considerations have been focused on the building layers that have an impact on the long-term functionality of the buildings (the structure and facade).

The existing buildings at 10-12 Museum Street and 35-41 New Oxford Street are to be retained and refurbished, increasing their longevity.

Substructure
For West Central Street, all existing basements will be retained in the Proposed Development.

New areas of substructure will be designed using reinforced concrete which is a durable material with a 50 year design life. The concrete should not require any maintenance during this period, and my expected to last beyond this.

Superstructure
The superstructure for the existing buildings at 10-12 Museum Street and 35-41 New Oxford Street is to be retained, with reinforcement/structural upgrades to existing floor joists where required, to increase building longevity.

The new superstructures in the Proposed Development are generally reinforced concrete frames. The same considerations apply as noted under "Substructure" in this Section. Where the new superstructures include steel framing, steel too is a durable material, and if maintained properly, would be expected to last beyond the Proposed Development's service life.

Facade
The facades for 10-12 Museum Street and 35-41 New Oxford Street are proposed to be retained, repaired, cleaned, and upgraded as necessary, increasing their longevity.

Facade materials will be specified with a focus on durability. Materiality for the residential facades is outlined under “Designing out Waste” in this Section, as well as the relevant sections of the DAS. For all buildings, the material palette uses, simple, robust, and long-lasting materials.

Different facade elements have different lifespans and it should be possible to replace shorter lifespan elements (e.g. re-glazing of insulated glazing units) in-situ to extend the overall lifespan of the facade.

Services
Strategy as noted under “Designing out Waste”.

Building services generally have a shorter lifespan than the structure and the facade, both due to durability of materials and systems, but also due to technical and regulatory development which may require upgrades to systems.

For 10-12 Museum Street, ventilation systems respect heritage constraints while ensuring adequate air quality. This approach avoids invasive retrofitting that could compromise the building’s structural integrity over time.

For Vine Line, where cooling isn’t currently required, future provision within the site-wide cooling network allows for easy adaptation if cooling becomes necessary. This adaptability reduces the likelihood of needing major retrofits, supporting longevity.

Systems have also been designed to be manufacturer independent as far as practical, allowing for future component replacement and upgrades without being tied to a single source of supply, or being required to replace proprietary distribution infrastructure.

The ventilation systems are designed with fresh air rates exceeding statutory requirements, thereby including capacity for future change of use or need. The heating and cooling systems are designed with an allowance for future climate change.

Space planning
The longevity of the space planning is contingent on the same considerations as that of the superstructure.

As noted under “Designing out Waste”, for all buildings, in highly trafficked areas, such as lobbies, publicly available space, and amenity spaces there will be an enhanced focus on robust and durable materials. This has already been considered in the materiality choices for the facades and finishes, refer to the DAS for more detail.

Designing for Adaptability or Flexibility
The principles of designing for adaptability or flexibility have been applied to multiple layers of the Proposed Development, and are key drivers to ensure that the building is fit for purpose and can be easily adapted to prevent premature obsolescence.

In this Section, the definitions in the GLA's Circular Economy Guidance, Table 3 are followed. Adaptability typically relates more to building structural changes, and flexibility relates to floorplates rather than structural changes.

The existing buildings at 10-12 Museum Street and 35-41 New Oxford Street are to be retained and refurbished, limiting the design choices with respect to adaptability or flexibility.

Substructure
Limited adaptability applicable to substructure, however as shown in the Pre-Redevelopment Audit (Section 2.2), it is possible to adapt existing substructures to suit a new above ground structure.

Superstructure
The new superstructures in the Proposed Development are generally reinforced concrete frames. These are generally proposed as flat slab constructions, which enable high levels of adaptability or flexibility to internal fit-outs, suitable for various accommodation use types (e.g. hotel, student accommodation, etc.).

Facade
For the new-build facades, the designs generally use passive strategies to ensure they are adaptable to a changing climate:

- The facade depth, articulation, and glazing extent are driven by mitigating excessive solar heat gains
- Operable windows or doors into balconies are used in order to fulfil ventilation and cooling demands.

As noted under "Designing out Waste", the facade systems are in all cases designed to allow for re-glazing without having to replace the framing or cladding. This means the performance could be adapted by replacing the glazing units only, without impacting the framing or cladding.

Services
Strategy as noted under "Designing out Waste".

As noted under "Designing for Longevity", the ventilation system provides flexibility for future changing requirements with fresh air rates exceeding statutory requirements. The heating and cooling systems are designed with an allowance for future climate change.

Systems have been modularised as far as practical allowing for repair or replacement of individual components on an ongoing basis.

Systems can be easily repaired, replaced, or upgraded as needed without extensive alterations, extending the lifespan of the infrastructure and adapting to future needs.

Centralising heating and cooling allows for flexibility in capacity adjustments or future technology upgrades, as changes can be made to the centralised system without altering individual units across buildings.

In Vine Lane, provision for future cooling is made without day one installation, allowing the system to adapt as cooling needs or environmental requirements evolve, conserving resources until they are necessary.

Space planning
The space plan for the existing buildings at 10-12 Museum Street and 35-41 New Oxford Street is to be retained.

The flexibility of the space plan is contingent on that of the structure, with the same considerations as noted under "Superstructure" in this Section.

Designing for Disassembly

The principle of designing for disassembly is considered across all relevant layers in the Proposed Development.

The existing buildings at 10-12 Museum Street and 35-41 New Oxford Street are to be retained and refurbished, limiting the design choices with respect to disassembly.

Substructure

Generally not applicable to substructures.

Superstructure

Reinforced concrete structures are inherently difficult to disassemble, but are proposed on balance for their attributes. Refer to "Using Materials That Can be Reused and Recycled" regarding recovery of concrete.

Where steel framing is used in the superstructure, connections will be detailed to ensure the steel frame can be later recovered for reuse or recycling.

Facade

For the new-build facades, the designs generally use modular components. It is anticipated that mechanical fixings will be used as far as possible, to enable future disassembly of the facade components and materials.

Services

Services strategy as noted in 'designing out waste'.

Modularisation enables components to be individually repaired or replaced without dismantling the entire system. This reduces material waste and allows easy disassembly, extending the lifespan of each unit.

The Sitewide Heating and Cooling Networks reduce the need for individual systems in each building. By consolidating heating and cooling infrastructure, fewer components are installed overall, simplifying future disassembly, repair, and eventual material recovery.

Limiting active cooling to necessary areas minimises the number of components that would require disassembly and replacement over time.

Space planning

For the limited extents of landlord-controlled fit-out in the residential buildings, the use of mechanical connections in lieu of adhesives for finishes, fixtures, fitted furniture, and the like will be prioritised, where technically, practically, and commercially feasible.

Specifications to be considered during procurement to maximise disassembly.

Using Materials That Can be Reused and Recycled
Wherever it is technically, practically, and commercially feasible, the Proposed Development will prioritise the use of reusable and/or recyclable materials. Early engagement with the supply chains will be sought to mitigate procurement risks so far as possible.

Substructure
All strategies are as per the commercial building, see Section 3.2.

Superstructure
As noted under "Designing out Waste", where the proposed superstructure is designed as a steel frame, the steel will be recoverable at end of life, to feed the reused steel market, or recycling, providing benefits beyond the system boundary.

For the concrete decks, current best practice is to crush concrete for secondary uses, with reinforcement separated for closed-loop recycling. However as noted in Section 2.5.4, the Proposed Development continues to investigate the feasibility of novel ways of reusing concrete, and it is possible that such methods are more widely adopted by the time the concrete reaches end of life stage.

Facade
As noted under "Designing out Waste", the current new-build facade designs incorporate materials that predominantly have high potential for reuse or recycling

Services
As noted under "Designing for Disassembly", services equipment uses standardised components, fabricated off-site which means, where the relevant capability exists, equipment can be refurbished for reuse.

Equipment that is metallic and homogeneous (e.g. sheet ductwork, cable trays, etc.), have high potential for recycling.

Space planning
For the limited extents of landlord-controlled fit out in the residential buildings, where technically, practically, and commercially feasible, products/finishes will be sought that can be reused/recycled.

Specifications to be considered during procurement to maximise reusability or recyclability.

Stuff
For the limited areas of landlord-controlled fit-out, loose furniture, appliances, etc., within the residential buildings, products that can be carefully removed from site and either offered to local charities, or community groups or sold on directly to third parties at end of life will be prioritised. Where furniture is unable to be sold on it can disassembled into its material parts and recycled through manufacturer closed loop recycling schemes, where appropriate, or via registered recycling contractors.

Specifications to be considered during procurement to maximise reusability or recyclability.

Chapter 4

Reporting

4.1 Bill of Materials and Recycled Content

4.1.1 General

A Bill of Materials has been provided within the GLA Circular Economy Statement Template issued with this Statement.

This is the same Bill of Materials as per that contained in the consented Circular Economy Statement. The Bill of Materials is aligned with the corresponding Whole Life-cycle Carbon Assessment (WLCA).

The quantities captured in this Bill of Materials reflect the items that were quantified in the WLCA. Material element categories that were included as benchmark values or cost coverage factors in the WLCA were not captured in the Bill of Materials. This is commensurate with the stage of design.

The Proposed Development's overall mass of raw materials during the construction stage [A1-A3] is 78,769 tonnes (new material only, not including material retained in-situ from the existing building.

4.1.2 Recycled Content by Value

The recycled content by value estimate in the consented Circular Economy Statement was 47%.

However, the estimate of recycled content by value has been updated to reflect more recent information. Specifically the following has been amended:

- GGBS specifications as per RICS PS v1 Table 6
- Structural steel specification as per RICS PS v1 Table 6
- Aluminium specification as per RICS PS v1 Table 6
- Raised access floor specification assumed to be new (reused will be sought where possible).

The assumed percentages of recycled content for materials in the Proposed Development are as follows:

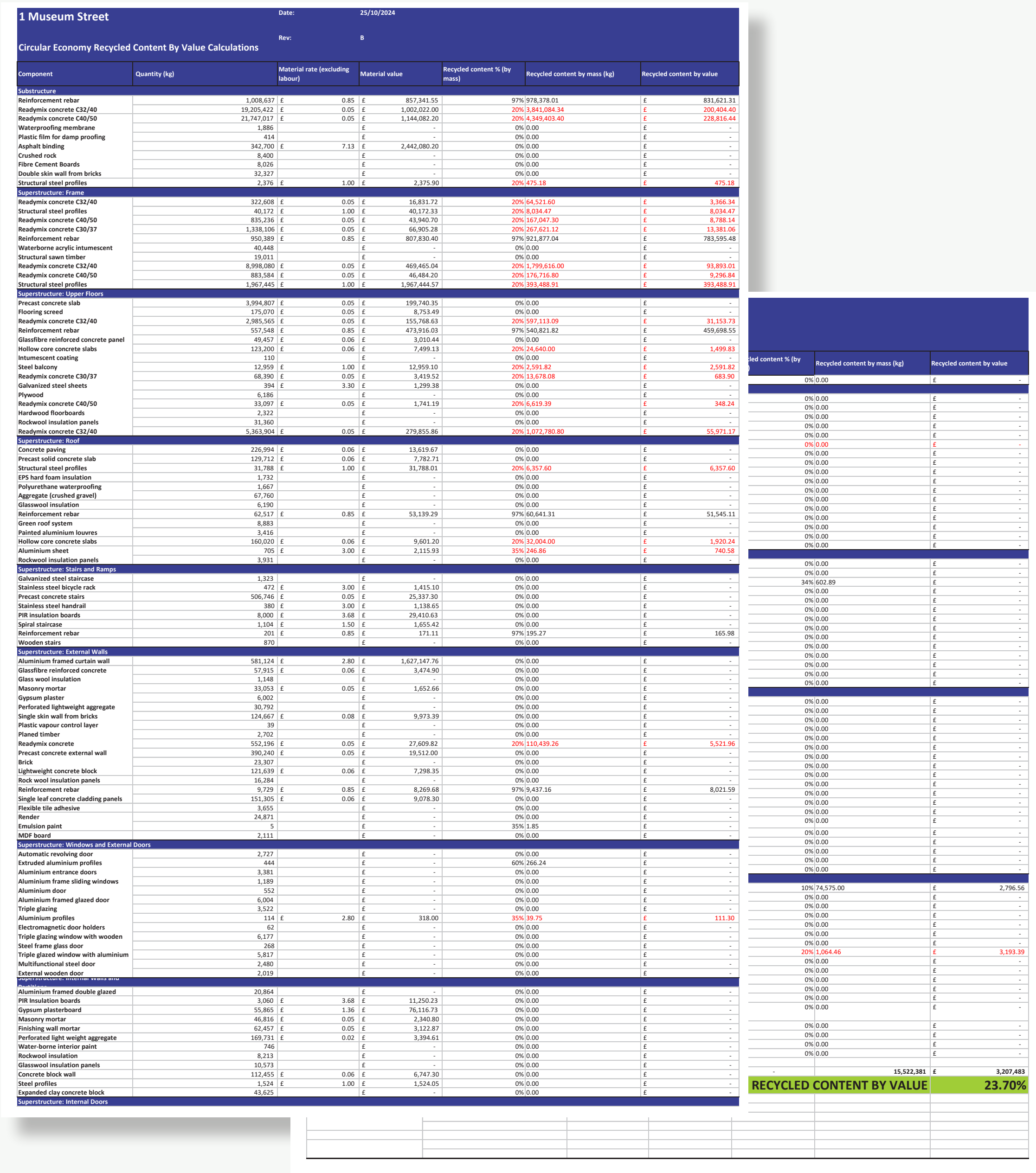
- In-situ concretes 20%
- Structural steel 20%
- Aluminium 35%
- Reinforcement 97%.

Of the 78,769 tonnes of materials, 15,522 tonnes are of recycled content. This makes up 23.7% recycled content by value. This does not include material retained in-situ from the existing building, which as shown in Section 2.4.3, accounts for approximately 49% (by mass) of existing material.

In later stages the project team will investigate further strategies to increase the percentage of recycled and reused content.

Refer to Appendix D.

Recycled Content by Value Calculations



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Circular Economy Recycled Content By Value Calculations

Component	Quantity (kg)	Material rate (excluding labour)	Material value	Recycled content % (by mass)	Recycled content by mass (kg)	Recycled content by value
Substructure						
Reinforcement rebar	1,008,637	£ 0.85	£ 857,341.55	97%	978,378.01	£ 831,621.31
Readymix concrete C32/40	19,205,422	£ 0.05	£ 1,002,022.00	20%	3,841,084.34	£ 200,404.40
Readymix concrete C40/50	21,747,017	£ 0.05	£ 1,144,082.20	20%	4,349,403.40	£ 228,816.44
Waterproofing membrane	1,886		£ -	0%	0.00	£ -
Plastic film for damp proofing	414		£ -	0%	0.00	£ -
Asphalt binding	342,700	£ 7.13	£ 2,442,080.20	0%	0.00	£ -
Crushed rock	8,400		£ -	0%	0.00	£ -
Fibre Cement Boards	8,026		£ -	0%	0.00	£ -
Double skin wall from bricks	32,327		£ -	0%	0.00	£ -
Structural steel profiles	2,376	£ 1.00	£ 2,375.90	20%	475.18	£ 475.18
Superstructure: Frame						
Readymix concrete C32/40	322,608	£ 0.05	£ 16,831.72	20%	64,521.60	£ 3,366.34
Structural steel profiles	40,172	£ 1.00	£ 40,172.33	20%	8,034.47	£ 8,034.47
Readymix concrete C40/50	835,236	£ 0.05	£ 43,940.70	20%	167,047.30	£ 8,788.14
Readymix concrete C30/37	1,338,106	£ 0.05	£ 66,905.28	20%	267,621.12	£ 13,381.06
Reinforcement rebar	950,389	£ 0.85	£ 807,830.40	97%	921,877.04	£ 783,595.48
Waterborne acrylic intumescent	40,448		£ -	0%	0.00	£ -
Structural sawn timber	19,011		£ -	0%	0.00	£ -
Readymix concrete C32/40	8,998,080	£ 0.05	£ 469,465.04	20%	1,799,616.00	£ 93,893.01
Readymix concrete C40/50	883,584	£ 0.05	£ 46,484.20	20%	176,716.80	£ 9,296.84
Structural steel profiles	1,967,445	£ 1.00	£ 1,967,444.57	20%	393,488.91	£ 393,488.91
Superstructure: Upper Floors						
Precast concrete slab	3,994,807	£ 0.05	£ 199,740.35	0%	0.00	£ -
Flooring screed	175,070	£ 0.05	£ 8,753.49	0%	0.00	£ -
Readymix concrete C32/40	2,985,565	£ 0.05	£ 155,768.63	20%	597,113.09	£ 31,153.73
Reinforcement rebar	557,548	£ 0.85	£ 473,916.03	97%	540,821.82	£ 459,698.55
Glassfibre reinforced concrete panel	49,457	£ 0.06	£ 3,010.44	0%	0.00	£ -
Hollow core concrete slabs	123,200	£ 0.06	£ 7,499.13	20%	24,640.00	£ 1,499.83
Intumescent coating	110		£ -	0%	0.00	£ -
Steel balcony	12,959	£ 1.00	£ 12,959.10	20%	2,591.82	£ 2,591.82
Readymix concrete C30/37	68,390	£ 0.05	£ 3,419.52	20%	13,678.08	£ 683.90
Galvanized steel sheets	394	£ 3.30	£ 1,299.38	0%	0.00	£ -
Plywood	6,186		£ -	0%	0.00	£ -
Readymix concrete C40/50	33,097	£ 0.05	£ 1,741.19	20%	6,619.39	£ 348.24
Hardwood floorboards	2,322		£ -	0%	0.00	£ -
Rockwool insulation panels	31,360		£ -	0%	0.00	£ -
Readymix concrete C32/40	5,363,904	£ 0.05	£ 279,855.86	20%	1,072,780.80	£ 55,971.17
Superstructure: Roof						
Concrete paving	226,994	£ 0.06	£ 13,619.67	0%	0.00	£ -
Precast solid concrete slab	129,712	£ 0.06	£ 7,782.71	0%	0.00	£ -
Structural steel profiles	31,788	£ 1.00	£ 31,788.01	20%	6,357.60	£ 6,357.60
EPS hard foam insulation	1,732		£ -	0%	0.00	£ -
Polyurethane waterproofing	1,667		£ -	0%	0.00	£ -
Aggregate (crushed gravel)	67,760		£ -	0%	0.00	£ -
Glasswool insulation	6,190		£ -	0%	0.00	£ -
Reinforcement rebar	62,517	£ 0.85	£ 53,139.29	97%	60,641.31	£ 51,545.11
Green roof system	8,883		£ -	0%	0.00	£ -
Painted aluminium louvres	3,416		£ -	0%	0.00	£ -
Hollow core concrete slabs	160,020	£ 0.06	£ 9,601.20	20%	32,004.00	£ 1,920.24
Aluminium sheet	705	£ 3.00	£ 2,115.93	35%	246.86	£ 740.58
Rockwool insulation panels	3,931		£ -	0%	0.00	£ -
Superstructure: Stairs and Ramps						
Galvanized steel staircase	1,323		£ -	0%	0.00	£ -
Stainless steel bicycle rack	472	£ 3.00	£ 1,415.10	0%	0.00	£ -
Precast concrete stairs	506,746	£ 0.05	£ 25,337.30	0%	0.00	£ -
Stainless steel handrail	380	£ 3.00	£ 1,138.65	0%	0.00	£ -
PIR insulation boards	8,000	£ 3.68	£ 29,410.63	0%	0.00	£ -
Spiral staircase	1,104	£ 1.50	£ 1,655.42	0%	0.00	£ -
Reinforcement rebar	201	£ 0.85	£ 171.11	97%	195.27	£ 165.98
Wooden stairs	870		£ -	0%	0.00	£ -
Superstructure: External Walls						
Aluminium framed curtain wall	581,124	£ 2.80	£ 1,627,147.76	0%	0.00	£ -
Glassfibre reinforced concrete	57,915	£ 0.06	£ 3,474.90	0%	0.00	£ -
Glass wool insulation	1,148		£ -	0%	0.00	£ -
Masonry mortar	33,053	£ 0.05	£ 1,652.66	0%	0.00	£ -
Gypsum plaster	6,002		£ -	0%	0.00	£ -
Perforated lightweight aggregate	30,792		£ -	0%	0.00	£ -
Single skin wall from bricks	124,667	£ 0.08	£ 9,973.39	0%	0.00	£ -
Plastic vapour control layer	39		£ -	0%	0.00	£ -
Planed timber	2,702		£ -	0%	0.00	£ -
Readymix concrete	552,196	£ 0.05	£ 27,609.82	20%	110,439.26	£ 5,521.96
Precast concrete external wall	390,240	£ 0.05	£ 19,512.00	0%	0.00	£ -
Brick	23,307		£ -	0%	0.00	£ -
Lightweight concrete block	121,639	£ 0.06	£ 7,298.35	0%	0.00	£ -
Rock wool insulation panels	16,284		£ -	0%	0.00	£ -
Reinforcement rebar	9,729	£ 0.85	£ 8,269.68	97%	9,437.16	£ 8,021.59
Single leaf concrete cladding panels	151,305	£ 0.06	£ 9,078.30	0%	0.00	£ -
Flexible tile adhesive	3,655		£ -	0%	0.00	£ -
Render	24,871		£ -	0%	0.00	£ -
Emulsion paint	5		£ -	35%	1.85	£ -
MDF board	2,111		£ -	0%	0.00	£ -
Superstructure: Windows and External Doors						
Automatic revolving door	2,727		£ -	0%	0.00	£ -
Extruded aluminium profiles	444		£ -	60%	266.24	£ -
Aluminium entrance doors	3,381		£ -	0%	0.00	£ -
Aluminium frame sliding windows	1,189		£ -	0%	0.00	£ -
Aluminium door	552		£ -	0%	0.00	£ -
Aluminium framed glazed door	6,004		£ -	0%	0.00	£ -
Triple glazing	3,522		£ -	0%	0.00	£ -
Aluminium profiles	114	£ 2.80	£ 318.00	35%	39.75	£ 111.30
Electromagnetic door holders	62		£ -	0%	0.00	£ -
Triple glazing window with wooden	6,177		£ -	0%	0.00	£ -
Steel frame glass door	268		£ -	0%	0.00	£ -
Triple glazed window with aluminium	5,817		£ -	0%	0.00	£ -
Multifunctional steel door	2,480		£ -	0%	0.00	£ -
External wooden door	2,019		£ -	0%	0.00	£ -
Superstructure: Internal Walls and Partitions						
Aluminium framed double glazed	20,864		£ -	0%	0.00	£ -
PIR Insulation boards	3,060	£ 3.68	£ 11,250.23	0%	0.00	£ -
Gypsum plasterboard	55,865	£ 1.36	£ 76,116.73	0%	0.00	£ -
Masonry mortar	46,816	£ 0.05	£ 2,340.80	0%	0.00	£ -
Finishing wall mortar	62,457	£ 0.05	£ 3,122.87	0%	0.00	£ -
Perforated light weight aggregate	169,731	£ 0.02	£ 3,394.61	0%	0.00	£ -
Water-borne interior paint	746		£ -	0%	0.00	£ -
Rockwool insulation	8,213		£ -	0%	0.00	£ -
Glasswool insulation panels	10,573		£ -	0%	0.00	£ -
Concrete block wall	112,455	£ 0.06	£ 6,747.30	0%	0.00	£ -
Steel profiles	1,524	£ 1.00	£ 1,524.05	0%	0.00	£ -
Expanded clay concrete block	43,625		£ -	0%	0.00	£ -
Superstructure: Internal Doors						

-	15,522,381	£ 3,207,483
RECYCLED CONTENT BY VALUE		**23.70%**

Figure 4.1 Recycled content by value calculations. Refer to Appendix D.

4.2 Recycling and Waste Reporting

4.1.3 General

The Recycling and Waste Reporting Table has been provided within the GLA Circular Economy Statement Template issued with this Statement.

The demolition waste arisings are estimated in the Pre-Demolition Audit.

The excavation waste arisings have been provided by HTS, see Appendix H.

The construction waste arisings have been estimated based on guidance from the London Plan. The Site Waste Management Plans have been updated by John F Hunt, but do not contain estimates for construction waste arisings. It is anticipated that would be progressed by the contractors at the appropriate time.

The municipal waste arisings have been estimated in the by Operational Waste Management Plan by Arup, see Appendix E.

The Circular Economy Targets and Recycling and Waste Reporting Table are summarised overleaf.

Circular Economy Targets

	Policy Requirement	Target Aiming For (%)	Policy Met?
Demolition waste materials (non-hazardous)	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	98%	Exceeds Policy
Excavation waste materials	Minimum of 95% diverted from landfill for beneficial reuse.	95%	Yes
Construction waste materials	Minimum of 95% diverted from landfill for reuse, recycling or recovery.	95%	Yes
Municipal waste	Minimum 65% recycling rate by 2030.	75%	Exceeds Policy
Recycled content	Minimum 20% of the building material elements to be comprised of recycled or reused content.	23.7%	Exceeds Policy

Figure 4.2 Circular economy targets for the proposed development

Waste Reporting and Performance Indicator

	Source of Information	Overall Waste (tonnes)	Overall Waste (kg/m² GIA)	Performance Indicator
Demolition Waste	Pre-demolition Audit	19,609	0.633	3rd Quartile
Excavation Waste	Structural Engineer	7,642	0.247	2nd Quartile
Construction Waste	Calculated based on London Plan	3,120	0.101	3rd Quartile
Municipal Waste	Operational Waste Management Strategy	1,691	0.055	3rd Quartile

Figure 4.3 Waste arisings in the proposed development compared with GLA benchmark quartiles (Appendix 4 of the GLA CE Statement Guidance)

4.3 End of Life Strategy

4.3.1 General

The end of life scenarios included in the Bill of Materials are aligned with the Whole Life-cycle Carbon Assessment (WLCA) for the Proposed Development.

This is the same Bill of Materials and end of life routes as per that contained in the consented Circular Economy Statement. This is done to maintain consistency with the submitted WLCA.

Specific strategies to aid end of life recoverability have already been implemented as outlined in Sections 3.2 and 3.3, specifically:

- "Building in layers" approach with the structure, facade, MEP specifically designed to be independent of each other
- Modular, standardised facades that are mechanically fixed where possible to aid recovery
- Off the shelf, standardised MEP components that can be refurbished for reuse at end of life where capability exists
- Where soft-spots are proposed in the superstructure for One Museum Street, approaches to install these in such a way that they can be later removed and recovered will be investigated
- Glazing modules have generally been designed to be removable so that the glass can be crushed and sent for closed-loop recycling
- With regards to materials:
    - Structural steel sections can be dismantled and sent for reuse where feasible, otherwise sent to closed-loop steel recycling
    - Concrete can be crushed to secondary aggregates with reinforcement separated and recycled
    - Glass can be crushed and sent for closed-loop recycling
    - Aluminium framing, extrusions, and sheet can be separated and sent to closed-loop aluminium recycling
    - Plasterboard will be sent to gypsum recycling where possible
    - Timber products can be reused where possible via local community organisations, otherwise sent to incineration.

4.3.2 Commitments

The end of life strategy considerations in the consented Circular Economy Statement apply.

In addition, the Proposed Development is committed to promoting the Circular Economy for the industry at large, including approaches to improve end of life recovery.
To this end the following are being investigated by the project team:

- The project team is committed to using Building Information Modelling (BIM) to ensure detailed records are maintained and transferable to future building owners. The requirements will be detailed in a BIM Execution Plan at the relevant project stage.
- The Post-construction Circular Economy Report will act as documentation of the materials and proposed end of life routes. This will be shared as part of the O&M Manual for future building owners.
- As noted under Section 2.5.4, the Proposed Development continues to investigate the feasibility of novel ways of reusing concrete, and it is possible that such methods are more widely adopted by the time the concrete reaches end of life stage.
- The project team will investigate the use of Material Passports for key reusable materials to maximise potential for end of life recovery. Where possible, this will be harmonised with the BIM Execution Plan.
- The project team will explore producing a "Circular Economy Users' Guide" providing simple strategies for adaptation and end of life recovery for materials to be communicated to future building owners and occupiers.

To secure implementation, where relevant, any of the above that are taken forward will be secured in contract through requirements in the Contractor Preliminaries.

4.3.3 Communication

As noted under "Commitments", any specific strategies that are intended to aid end of life recovery will be captured in the O&M Manual so that is it communicated to future building owners.

Contingent on the BIM Execution Plan, part of the handover to future building owners will include the detailed BIM models.

In order to better communicate Circular Economy recovery opportunities at end of life, the project team will explore producing a dedicated guide to be handed over to future building owners and occupiers.

4.4 Plans for Implementation

The Circular Economy aspirations set out in this Circular Economy Statement will be the responsibility of the project team during the design stages.

The design team is committed to ensuring ongoing monitoring of the stated Circular Economy strategies. Design commitments will be secured and advanced through materials and Circular Economy workshops to be held throughout the project stages. These workshops will be used to assess designs in line with the Circular Economy commitments and principles set out in this statement.

Where appropriate, targets and performance clauses will be included part of Contractor Preliminaries, to secure their implementation, with regular reporting required for tracking.

During the procurement and construction stages, the responsibility to carry forward the principles set out in this Circular Economy Statement will be with the Principal Contractor. It is anticipated that the Principal Contractor will appoint a responsible individual to monitor the principles, targets and commitments set out in this Circular Economy Statement. This will include completing/updating the Bill of Materials and Recycling and Waste Reporting Table in the GLA Circular Economy Statement Template.

The following documents are actively being used to support the implementation of the aspirations outlined in this statement:

- Pre-Redevelopment Audit (refer to Appendix A)
- Pre-Demolition Audit (refer to Appendix B)
- Material efficiency report BREEAM Mat 06 - to be tracked and updated at each of the RIBA stages with implementation recorded from RIBA Stage 4
- Functional Adaptation study BREEAM Wst 06 - to be updated during RIBA Stage 4
- Sustainable Procurement Plan - to be updated as required.

As part of RIBA Stage 3 and going forwards, the project team has committed to making Circular Economy part of the standing agenda. This means each discipline will provide regular Circular Economy updates during Design Team Meetings, as the strategies and opportunities outlined in this Statement are developed. The team will also review existing Circular Economy targets and opportunities, and where appropriate, identify areas for improvement.

From an early engagment with John F Hunt, the contractor will provide on-site instruction of appropriate separation, handling, recycling, reuse and return methods to be used by all parties at all appropriate stages of the Project. The SWMP will also be mentioned in the site induction process. This will ensure that everyone feels they are included and that their participation is meaningful.

4.5 Post-Construction Reporting

It is agreed that a Post-Construction Circular Economy Report will be prepared on completion of the works, and submitted to the local planning authority.

This report will be produced in line with the GLA Circular Economy Statement Guidance to include:

- Updated Bill of Materials based on actual materials used
- Updated Recycling and Waste Reporting Table based on actual materials handled, quantities, destinations, etc.
- As-built performance against all the key commitments and metrics that are included in this Circular Economy Statement
- Lessons learnt
- Supporting evidence as appendices.

Where significant change is noticed, between the as-built performance and the commitments in this statement, explanation will be provided to describe the reasons that have caused the difference.

Chapter 5

Conclusions

5.1 Conclusions

In response to London Plan Policy SI 7 and Camden Local Plan 2017, this Circular Economy Statement demonstrates how the Proposed Development adopts the principles of the Circular Economy across all areas of design, construction, and operation.

Wherever technically, practically, and economically feasible, the Proposed Development aspires to maximise re-use of existing buildings, reduce material quantities in the first instance, and reduce waste associated with the Proposed Development, both in its construction, use, and at end of life.

To this end, the Proposed Development includes a range of Circular Economy strategies and approaches, as detailed in this Circular Economy Statement and its supporting appendices, including:

- **Minimising construction, demolition, and excavation waste**
    - A Pre-Demolition Audit has been undertaken and is included in Appendix B
    - A rigorous approach to material recovery opportunities for on site and off site reuse/upcycling/recycling has been conducted
    - Investigating innovative approaches for reuse of concrete and recycling of building glass at scale
    - Designing modular facades utilising off-site manufacturing to reduce waste
    - Targeting 98% of demolition waste to be upcycled, recycled, or downcycled
    - Targeting 95% of construction waste to be upcycled, recycled, or downcycled
    - Targeting 95% of excavation waste to beneficial use
    - Targeting a limit of $7.5m^3$ or 6.5 tonnes/$100m^2$ GIA for non-residential construction waste
    - Targeting a limit of $26.52m^3$ or 16.90 tonnes/£100k project value for residential construction waste.

- **Minimising materials used on site**
    - Strategic retention of as much as possible of the existing buildings, reducing waste and the need for new materials
    - A Pre-Redevelopment Audit has been undertaken and is included in Appendix A
      Investigating design solutions that are suited to de-materialisation (e.g. exposed services)
    - Targeting efficient structural, facade, and MEP designs that reduce material intensity where possible.

- **Designing to maximise life-cycle**
  - Designing structures that are long-lasting and adaptable with generous, regular column grids and investigating a soft-spot strategy
  - Designing ventilation systems that enable flexible layouts (high-level FCUs with variable air volume fresh air)
  - Using standard modules and grids to enable flexible layouts
  - Considering layouts and risers for single- or multi-tenant splits
  - Considering the different building elements in layers to enable maintenance and replacement that minimises destructive impacts on other building elements (especially structure, facade, MEP)
  - Improving potential end of life recovery by investigating how to store and communicate deconstruction data for key building elements
  - Committing to submitting a Post-Construction Circular Economy Report to report as-built Circular Economy performance.

- **Reducing and minimising the use of energy**
  - Passive-first approach across all buildings
  - Operable panels are provided to enable natural ventilation
  - Refer to Energy Statement.

- **Procuring responsibly and sustainably**
  - Use of BREEAM-compliant sustainable procurement plan to guide material choices
  - Consideration of transport carbon emissions in selection of key materials
  - Using reused and/or high recycled content materials where possible, targeting 23.7% recycled content (by value) for new materials

- **Investigating smart waste minimisation for reducing municipal waste**
  - Dedicated storage areas for waste recycling
  - Contributing to the GLA's municipal waste target of 65% recycling by 2030
  - Committing to the London Environment Strategy's business waste target of 75% recycling by 2030.

The Bill of Materials and Recycling and Waste Reporting Table have been summarised in this statement, with the full details and calculations included in the GLA Circular Economy Statement Template which is found in Appendix C.

To ensure successful implementation, the key initiatives and commitments detailed in this statement, and its supporting documents, will be implemented, monitored, and/or reviewed as the design develops, and subsequently during the operational phase of the Proposed Development.

Appendices

Appendices

List of Appendices