JAW

Avonmouth House, London Borough of Southwark

Circular Economy Statement

25th October 2021

Version 01

Prepared by: George Nash

JAWSustainability

Contents

1 Introduction

1.1 Development Summary

This report summarises the waste and circular economy strategy for the proposed development of Avonmouth House in order to meet the sustainability requirements of the London Plan.

The site is situated in London Borough of Southwark. The development consists of the demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and/or Class F1(a) education use and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure. The site area is shown in Figure 1-1 below.

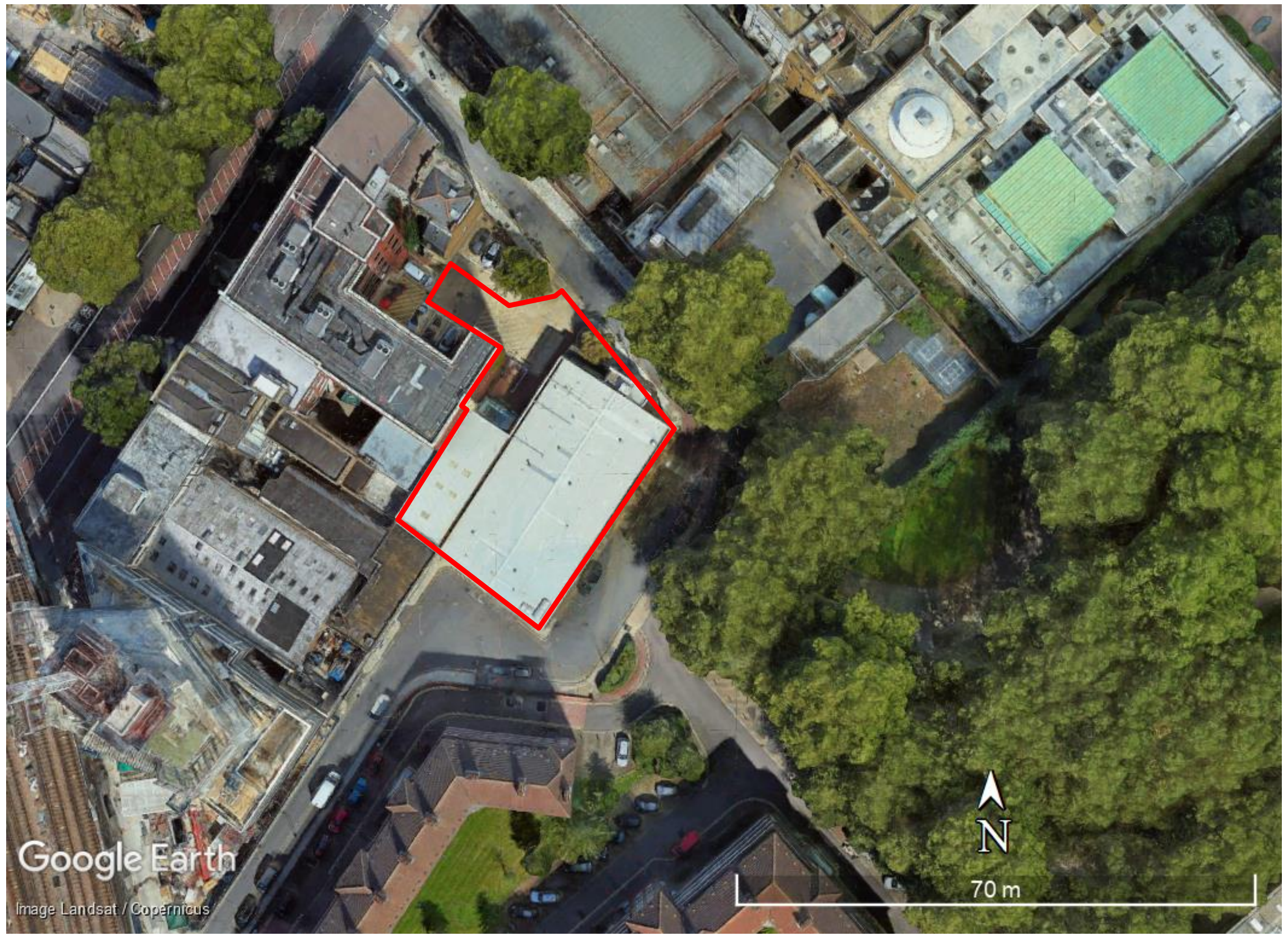

Figure 1-1 – Avonmouth House Site location

1.2 Policy

Policy SI 7, "Reducing waste and supporting the circular economy policy" from the London Plan outlines guidance for developments in reducing waste and supporting a circular economy

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

1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
2) encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products
3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026
4) meet or exceed the municipal waste recycling target of 65 per cent by 2030
5) meet or exceed the targets for each of the following waste and material streams:
    a) construction and demolition – 95 per cent reuse/recycling/recovery
    b) excavation – 95 per cent beneficial use
6) design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

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.

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

1.3 Method Statement

This circular economy report was in line with the new London plan policy SI 7, following the guidance outlined in "Circular Economy Statement Guidance Pre-Consultation Draft" document.

Following initial discussions, draft reports were produced outlining the circular economy strategy and issued to the design team for comment. A workshop was conducted with the design team on the 30/09/21 to review the circular economy strategy and identify further opportunities for the development.

1.4 Circular Economy Aspirations

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

2 Circular Economy Goals and Strategic Approach

The strategic approach for each section for the development is summarised in Appendix A.

The development is proposing the creation of a significant number of student accommodation units, as well as employment space/community health hub in the basement, ground and first floors. The existing building on the site is a 2 storey conference centre. It does not effectively use up the plot and is not suitable for refurbishment or repurposing into student accommodation.

The proposed strategy for the existing buildings on the development is to deconstruct and recycle the materials.

The proposed new development is a long-life development. The student section of the new development is not intended for regular change and as such will primarily be guided by the requirement for longevity. As such these sections of the development will be designed to meet long term needs while being durable and resilient to a changing climate. These areas will have had internal layouts fully designed to optimise the usage of the internal space, with spaces being fully fitted out as part of the construction.

The employment/education use/community health hubs sections in the basement, ground floors and first floors are more likely to undergo use change and as such are guided by the principle of adaptability. This means it will be designed to meet the needs of the present, but with consideration of how those needs might change in the future and designed for change in the form of periodic remodelling including alterations or replacement of non-structural parts. These spaces are going to be provide as large open plan spaces to allow it to be adapted to any end user and are unlikely to be fitted out as part of the main build. Ceiling height will be maximised to ensure the space has maximum flexibility. These spaces will have the capacity to connect to the building main plant but will not be fitted out to prevent unnecessary systems installation

3 Circular Economy Commitments

3.1 Circular Economy Narrative

The commitments have been summarised in Appendix B, Table 2.

These will be reviewed and updated at the detailed design stage.

3.1.1 Conserve resources, increase efficiency and source sustainably

3.1.1.1 Minimise the quantities of materials used

When minimising the quantities of materials, it is about ensuring that unnecessary material is not used to meet the requirements of the building. The development will:

- The size and number of piles will be optimised to reduce material usage
- The slab will be optimised to balance concrete and reinforcement requirement
- Cooling systems will not to be provided in residential spaces unless absolutely required
- Employment/education use/community health hub areas not to be fully fitted out with services before end use is confirmed
- Flat slabs provided minimise material required for services distribution
- Units will be stacked, and kitchens/bathrooms coordinated to minimise pipework runs
- Floor plates in general will be rationalised as much as possible to maximise material efficiency, with the number of different unit types kept to a minimum
- Review opportunities to use permanent works as part of the permanent works

The key challenges here will be value engineering and programming. For example, piled foundations may not be the cheapest option available or an optimised slab may not be the quickest to construct. To ensure commitments are maintained, a review of them will be conducted during the detailed design stage to ensure consideration. This will be regularly revisited during DTMs.

3.1.1.2 Minimise the quantities of other resources used

The development has taken steps to ensure other resource use will be kept to a minimum, such as:

- The development is proposed to replace an existing building, which minimises the use of any virgin land
- Highly efficient building fabric propsoed to reduce energy demand in line with GLA targets
- Highly efficient services to be specified to reduce energy consumption to meet GLA targets
- Domestic water fittings to be installed to meet target of 105 l/p/day

The key challenges here will be site constraints and value engineering. For example, the sites proximity to a flight path place restriction on the height. Value engineering may decrease the performance of the building. To prevent this, an energy strategy will be produced to ensure the building meets its energy efficiency requirements. Variations from the original energy strategy should be checked to ensure the development still complies with its energy targets. All commitments will be reviewed at the detailed design stage to ensure consideration by the design team.

3.1.1.3 Specify and source materials and other resources responsibly and sustainably

When specifying, materials with a high recycled content will be prioritised. The development will:

- Consider opportunities to use cement replacement materials in concrete, with products with up to 50% available in London. Amount of recycled binders in concrete should be maximised, subject to structural and cost considerations. To be reviewed by the structural engineer when specifying concrete

- Consider opportunities for recycled aggregate, especially in non-structural concrete
- Reinforcing steel should be specified with a high recycled content
- Internal framing products, such as steel studs and plasterboard to be specified with a high recycled content
- At the detailed design stage, the design team will review specifications to target specifying 20% reused or recycled material by value.
- Opportunities to source materials locally will be prioritised
- The external skin will brick based, which is a natural, durable and reusable material
- Opportunities to specify ducting/pipework with a high recycled content will be reviewed at detailed design stage
- All timber will be FSC certified
- Where possible EPDs of products will be identified, lower carbon options will be selected

The key challenges here will be value engineering and procurement, and lower quality products being used then originally intended by the design team. For example, many materials with higher recycled content can be more expensive to source. The design team should review commitments and identify achievable recycled content requirements of key materials. These targets will then be included within the specification of materials. The contractor will be required to provide evidence that key materials meet the required specification and complete the Bill of Materials Reporting table in Appendix C on completion.

3.1.2 Design to eliminate waste (and for ease of maintenance)

3.1.2.1 Design for longevity, adaptability or flexibility and reusability or recoverability

The principle guiding strategy behind the development is the design for longevity. These principles have guided the overall approach to the development, such as:

- The development will use a reinforced concrete frame which will last for at least the design life of the development and can be extended with sufficient maintenance
- Brick external walls will be used which have a lifespan beyond the design life of the development
- An overheating study conducted to reduce overheating in future climate scenarios
- Where feasible, excess plant space will be provided to allow adaptability in the future
- Internal walls to be provided in all residential spaces to last the life span of the development. Internal walls are primarily non-structural and as such provide options for adaptability and refurbishment beyond the design life of the development
- employment/education use/community health hub spaces will be open plan with an increased ceiling height to allow maximum adaptability
- Once a contractor is appointed, opportunities to use permanent works as part of the temporary works will be reviewed

The key challenge here will be value engineering. All materials and systems should be designed for longevity, which means they should be robust to ensure they last the lifetime of the development. All commitments will be reviewed at the detailed design stage to ensure consideration by the design team.

3.1.2.2 Design out construction, demolition, excavation and municipal waste arising

Design designs have/will be taken that minimise the quantity of waste generated by the development, such as:

- Use crushed demolition waste to level site and for a piling matt
- Windows types have been kept to a minimum to minimise variation and waste caused by bespoke production
- A consistent material pallet been used throughout the development to minimise variation of waste types
- Services will be fully coordinated offsite prior to installation, to maximise efficiency and minimise waste.
- Consideration should be given to a top down construction method for the basements, which can significantly reduce the amount of temporary works required, reduce material and waste. The feasibility of this will depend on final structural design, site limitations and cost/schedule requirements. This will be considered at a later stage.

The key challenge here will be programming and coordination. Starting on site can prior to design issues being resolved can lead to material wastage. Sufficient lead time will be provided to allow a fully co-ordinated design to take place.

3.1.3 Manage waste sustainably and at the highest value

3.1.3.1 Manage demolition, excavation & construction waste

In order to minimise waste from the demolition, excavation and construction of the project, the development will apply the following processes:

- 95 per cent of construction and demolition waste should be diverted from landfill for reuse/recycling/recovery
- 95 per cent of excavation should be put to beneficial use, such and landscaping, quarry infill etc. Opportunities to re-use or put to beneficial use should be considered
- Local waste processors will be identified that send minimum quantities of material to landfill
- Waste will be segregated on site to maximise opportunities for re-use and recycling
- Rubble from the demolition to be used as a piling matt
- Opportunities to use excavation waste on site for landscaping should be reviewed
- Material quantities to be well planned to minimise over ordering
- Offcuts will be kept separate from other waste streams to be made available for reuse on or off site
- Materials only to be delivered to site when needed, to prevent damage
- Material suppliers will be required to taken back excess material and packaging material

The key challenge will be programming. Without sufficient lead time, effectively planning to manage demolition and construction waste will be challenging. As such, a contractor will be appointed will sufficiently time to review design and circular economy commitment swill be reviewed with the contractor and the design team. The contractor will be required to submit waste reports and complete the Recycling and Waste Reporting table in Appendix D on completion

3.1.3.2 Manage municipal waste

Municipal waste will be recycled through the local authority waste and recycling services. In order to minimise waste, the development will apply the following principles:

- Bin store capacity will provide separate waste and recycling bins to allow for separation of waste, in line with the requirements of the local authority
- Separate waste bins should be provided within each cluster to facilitate easy separation of waste by the residents
- The bin store will provide capacity for at least 50% of the expected volume of waste from each student room (60lt per room) for recycling
- Excess capacity will be provided for residual waste to prevent bin overflowing
- Bin store use should be monitored by building management to check is the allocation of recycling and residual waste is appropriate to residents behaviour
- Bin store capacity will be flexible to allow for the increase in recycling capacity and decrease capacity of residual waste.
- Guidance should be provided to residents on what can and cant be recycled, with the aim of increases recycling to the point that 65% of municipal waste is recycled by 2030

3.2 Plans for implementation

The circular economy strategy will be reviewed by the design team at the detailed design stage. These commitments will be maintained when developing the design, with divergence from the commitments only made when absolutely necessary. Any further decisions that could be taken to enhance the buildings contributions to a circular economy should be considered.

Commitments to the recycled content of any specific materials will be included in the specification. Contractors will be required to submit drawings and submittals to ensure products meet with the specification.

Contractors will be required to provide evidence that installation meets the specification on completion

A maintenance program will be produced to ensure that the development is looked after to minimise damage or replacement of building elements.

3.3 End-of-life strategy

The end of the life of the building has been consider from an early stage to ensure it can be simply deconstructed.

The first priority is to ensure the building lasts beyond its design life. The proposed development is built out of a conventional reinforce concrete flat slab frame and brick external cladding, both of which are well established and robust materials. These materials, when properly maintained and looked after, can outlast the proposed design life of the development. The internal walls are also largely non-structural. As such, at the end of its design life, the building would be suitable for refurbishment.

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

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

4 Conclusion

This report summarises the waste and circular economy strategy for development at Avonmouth House in order to meet the sustainability requirements of Policy SI 7, “Reducing waste and supporting the circular economy policy” from the London Plan

The site is situated in London Borough of Southwark. The proposed development consists of the demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and/or Class F1(a) education use and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure.

An overall strategic approach was identified for both the existing buildings on the site and the proposed new development.

A number of key commitments and design strategies were identified to ensure the development contribute towards a circular economy. These involve design decisions to minimise resources use, minimise waste and strategies to manage waste effectively. A plan for how these will be implemented was outlined.

The end of life strategy for the proposed development has been considered from an early stage and has been outlined within this document.

5 Appendix

5.1 Appendix A – Table 1 Strategic Approach

Aspect	Phase / Building / Area	Steering Approach	Explanation	Target	Supporting Analysis / Studies / Surveys / Audits
Circular economy approach for the existing site	Existing properties on the site	Demolish and recycle	The existing buildings on the site are not suitable for repurposing due to the different use class. As such it will be demolished and recycled. The site should meet the GLA target of 95 per cent reuse/recycling/recovery during demolition.	95% diversion from landfill	Pre-demolition audit
Circular economy approach for the new development	Excavation	Reuse	The design team should consider potential re-use applications for the excavation waste	95% put to beneficial use.	
	Residential Sections	Longevity	The development is entirely residential and are not intended for regular change and as such will primarily be guided by the requirement for longevity. As such these sections of the development will be designed to meet long term needs while being durable and resilient to a changing climate.	95% diversion from landfill at end of life	
	employment/education use/community health hub	Adaptability	These spaces are likely to undergo use changes intermittently, and as such will be guided by the requirement for adaptability. This space will be designed with an open plan layout	95% diversion from landfill at end of life	
Circular economy approach for municipal waste during operation	Residential Municipal Waste	Recycle	Bin store capacity will provide at least 50% of the expected volume of waste from each room for recycling. Guidance should be provided to residents on recycling to increase recycling rates. Bin store capacity will be flexible with the aim of increasing recycling capacity over time	65% of municipal waste is recycled by 2030	

5.2 Appendix B – Table 2 Key Commitments

	Site	Substructure	Super-structure	Shell/Skin	Services	Space	Stuff	Construction Stuff	Summary	Challenges	Counter-Actions + Who + When	Plan to prove and quantify
SECTION A: CONSERVE RESOURCES												
Minimising the quantities of materials used		Piled foundations prioritised over pad foundations as they typically use less material. Size and number of piles optimised to reduce material usage	The slab will be optimised to balance concrete and reinforcement requirement		Cooling systems not to be provided in residential spaces Commercial areas not to be fully fitted out with services before end use is confirmed Units have been stacked to minimise pipework runs Flat slabs provided minimise material required for services distribution	Floor plates will be rationalised as much as possible to maximise material efficiency		Review opportunities to use permanent works as part of the permanent works	Ensure that unnecessary material is not used to meet the requirements of the building	Value engineering and programming	Review of commitments to be conducted during the detailed Regularly revisited during DTMs.	Meeting Minute notes to be produced
Minimising the quantities of other resources used (energy, water, land)	The development will be built entirely on an existing commercial site, not using any virgin land			Highly efficient building fabric will be specified to reduce energy demand in line with GLA targets	Highly efficient services to be specified to reduce energy consumption to meet GLA targets Domestic water fittings to be installed to meet target of 105 l/p/day				Ensure other resource use will be kept to a minimum	Site constraints and value engineering.	Variations from the original energy strategy should be checked to ensure the development still complies with its energy targets	Water use calculations. As built EPCs
Specifying and sourcing materials responsibly and sustainably		Consider opportunities to use recycled aggregates and GGBS in concrete at detailed design stage Reinforcing steel should be specified with a high recycled content	Consider opportunities to use recycled aggregates and GGBS in concrete at detailed design stage Reinforcing steel should be specified with a high recycled content	Opportunities to source bricks locally will be considered	Opportunities to specify ducting/pipework with a high recycled content will be reviewed at detailed design stage	Internal framing products to be specified with a high recycled content	All timber will be FSC certified Where possible EPDs of products will be identified		When specifying, materials with a high recycled content will be prioritised	value engineering and procurement	design team to review commitments and identify recycled content requirements of key materials. Targets will be included within the specification of materials.	The contractor will be required to provide evidence that key materials meet the required specification and complete the Bill of Materials Reporting table
SECTION B: DESIGN TO ELIMINATE WASTE (AND FOR EASE OF MAINTENANCE)												
Designing for reusability / recoverability / longevity / adaptability / flexibility			The development will use a RC frame which will last the life space of the development and can be extended with sufficient maintenance.	Brick external walls will be used which have a lifespan beyond the design life of the development	An overheating study has been conducted to reduce overheating of the building in future climate scenarios Where feasible excess plant space will be provided to allow adaptability in the future	Internal walls to be provided in all residential space to last the life span of the development. As internal walls are primarily non-structural and as such provide options for adaptability and refurbishment beyond the lifespan of the development Commercial spaces will be open plan with an increased ceiling height to allow maximum adaptability		Review opportunities to use permanent works as part of the temporary works	Design for longevity with robust materials and systems that are capable of handling any change	Value Engineering	All materials and systems should be designed for longevity. All commitments will be reviewed at the detailed design stage	
Designing out construction, demolition, excavation, industrial and municipal waste arising		The development will minimise any excavation by not building a basement to minimise any excavation. Use crushed demolition waste to level site and for a piling matt Displacement piles will be considered, which minimises spoil from the site	Rebar for RC frame fabricated offsite	Windows types kept to a minimum to minimise variation and waste Limited number of materials have been used throughout the development to minimise variation of waste types	Services will be fully coordinated offsite prior to installation					Programming and coordination	Sufficient lead time will be provided to allow a fully co-ordinated design to take place.	
SECTION C: MANAGE WASTE												
Demolition waste	Local waste processors will be identified that send minimum quantities of material to landfill Waste will be segregated on site	Rubble from the demolition to be used as a piling matt								Programming	A contractor will be appointed will sufficiently time to review design and circular economy	The contractor will be required to submit waste reports, and complete

Excavation waste	Opportunities to use excavation waste on site should be reviewed										commitment swill be reviewed with the contractor and the design team	Recycling and Waste Reporting table on competition
Construction waste	Local waste processors will be identified that send minimum quantities of material to landfill Waste will be segregated on site	Material quantities to be well planned to minimise over ordering	Material quantities to be well planned to minimise over ordering	Material quantities to be well planned to minimise over ordering Materials only to be delivered to site when needed, to prevent damage	Material quantities to be well planned to minimise over ordering Materials only to be delivered to site when needed, to prevent damage	Material quantities to be well planned to minimise over ordering Materials only to be delivered to site when needed, to prevent damage		Material suppliers will be required to taken back excess material and packaging material				
Municipal and industrial waste						Capacity for at least 50% of the expected volume of waste from each student room for recycling Separate bins should be provided within each cluster to facilitate easy separation of recycling by the residents Excess capacity will be provided for residual waste to prevent bin overflowing Bin store capacity flexible to allow for the increase in recycling capacity and decrease capacity of residual waste						

5.3 Appendix C – Bill of Materials Reporting

Layer	Element	Material quantity (kg)	Material Intensity (kg/m2 GIA)	Recycled content (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m2)	Estimated recyclable materials (kg/m2)	Source of information
Substructure	Rebar	92,326		90% ambition				Life Cycle Assessment provisional estimates only
	Screed	55,800						
	Waterproofing	1,473						
	Ready Mix concrete	535,680		50% recycled binder ambition				
	Mineral Wool Insulation	2,455		40% ambition				
	Precast concrete block	125,970		20% ambition				
	Gypsum plasterboard	11,377		-				
Structure	Ready Mix Concrete	5,409,504		50% recycled binder ambition				
	Rebar	209,993		90% ambition				
	Steel profiles	39,614		50% ambition				
	Acoustic insulation	15		-				
	Mineral Wool Insulation	22,599		40% ambition				
	RAF	2,594						
	Fire board	5,529						
	screed	167,738						
	Acoustic insulation	1,735						
	Plasterboard	119,505		-				
Shell/Skin	Ready Mix Concrete	1,630,249		50% recycled binder ambition				
	Plasterboard	102,038		-				
	Bitumen-polymer membrane	6,848						
	Mineral Wool Insulation	143,683		40% ambition				
	Rebar	19,695		90% ambition				
	Concrete Block	44,700		20% ambition				
	Brick	577,799		-				
	Plywood	19,650		-				
	Steel Profiles	27,184		50% ambition				
	Mortar	196,512		-				
	Skylight	32		-				
	Aluminium Framed door	1,118		-				
	Aluminium Framed Window	25,758		-				
Space	paint	2,958						
	Plasterboard	319,347		-				
	Mineral Wool Insulation	49,394		40% ambition				
	Ready Mix Concrete	2,385,984		50% recycled binder ambition				
	Concrete Block	156,000		20% ambition				
	Plywood	13,310		-				
	Doors	61,048		-				
	RAF	6,208		-				
	Sealant	114		-				
	Tiles	14,337						
	composite Flooring	2,545						
	Carpet	4,245						
	underlay	1,179						

5.4 Appendix D – Recycling and Waste Reporting

<table>
<tr><th rowspan="2"></th><th rowspan="2">Total Estimate (t/m2)</th><th rowspan="2">% reused or recycled onsite</th><th rowspan="2">% reused or recycled offsite</th><th colspan="2">% no reused or recycled</th><th rowspan="2">Source of information</th></tr>
<tr><th>% to landfill</th><th>% to other management</th></tr>
<tr><td rowspan="2">Excavation waste</td><td rowspan="2">1.37 tonnes</td><td rowspan="2">-</td><td rowspan="2">95%</td><td colspan="2">5%</td><td rowspan="2">Basement volume multiplied by London clay density (assumed 1.93 t/m3)</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">Demolition waste</td><td rowspan="2">0.18 tonnes</td><td rowspan="2">-</td><td rowspan="2">95%</td><td colspan="2">5%</td><td rowspan="2">Estimated as 1 tonnes per 1m2 of demolition floor area</td></tr>
<tr><td>-</td><td>5%</td></tr>
<tr><td rowspan="2">Construction waste</td><td rowspan="2">0.065</td><td rowspan="2">-</td><td rowspan="2">95%</td><td colspan="2">5%</td><td rowspan="2">Estimated as 6.5 tonnes per 100m2 GIA</td></tr>
<tr><td>-</td><td>5%</td></tr>
<tr><th rowspan="2"></th><th rowspan="2">Total Estimate (t/annum)</th><th rowspan="2">% reused on or offsite</th><th rowspan="2">% recycled on or offsite</th><th colspan="2">% no reused or recycled</th><th rowspan="2">Source of information</th></tr>
<tr><th>% to landfill</th><th>% to other management</th></tr>
<tr><td rowspan="2">Municipal waste</td><td rowspan="2">93.9</td><td rowspan="2">-</td><td rowspan="2">45%</td><td colspan="2">55%</td><td rowspan="2">Estimated based on DEFRA statistics (403 kg per person)</td></tr>
<tr><td>10%</td><td>45%</td></tr>
<tr><td rowspan="2">Industrial waste (if applicable)</td><td rowspan="2">-</td><td rowspan="2">-</td><td rowspan="2">-</td><td colspan="2"></td><td rowspan="2"></td></tr>
<tr><td></td><td></td></tr>
</table>

5.5 Pre demolition Audit

5.5.1 Identified Materials

Access to the site to conduct a full pre-demolition audit was not feasible at this stage of the development. The items have been identified based on-site photos provided by the design team and satellite imagery.

A full pre demolition audit should be undertaken by the Demolition Contractor once appointed, to maximise the recovery of material. This is part of the BREEAM strategy for the development.

An existing two storey commercial building currently occupies the site. The existing building appears to have been used as a warehouse which was later converted into a conference centre. The existing building appears to share party walls with neighbouring buildings to the west and north of the site. The nature of the relationship along the party walls is unclear at this point of the report. Prior to demolition, intrusive structural investigation will be required to determine the form and nature of the party wall to inform the demolition specification.

5.5.2 Waste Hierarchy

This audit aims to reduce impacts upon the environment by limiting waste sent to landfill. Diversion from landfill should be achieved by following the methods outlined in the Waste Hierarchy in order of importance, as shown in Figure 5.1.

The following assessment addresses each stage of the hierarchy with respect to the demolition works proposed for the development.

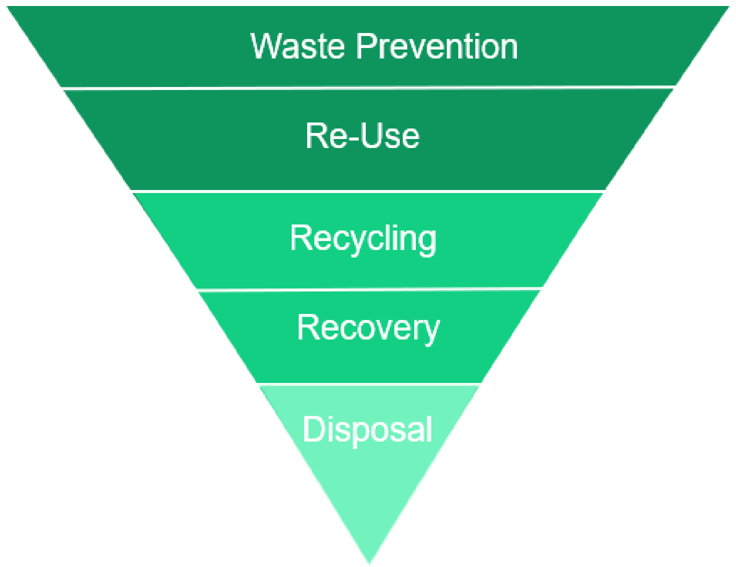

Figure 5.1 The Waste Hierarchy

5.5.3 Waste Prevention

Preventing waste completely is a key aspect to the waste hierarchy. As the proposed development utilised the full site, it would not be feasible to keep any of the existing structures on the site.

5.5.4 Re-Use

Direct re-use occurs when an item is re-used on site or at another site without being sent to a re-processor or recycler or is not removed from the site at all. Re-use is most relevant during the soft strip of the internal areas, and primarily applies to individual items that can be easily taken apart or separated from the building without causing damage.

Many items of value can be removed and sold to reclamation yards. In order to maximise opportunities for re-use, building elements should be removed with care and separated. This can be a time consuming process, so in order to maximise re-use, it is recommended that the demolition contractor is provided with sufficient lead time to recover and advertise any reusable items on material exchange websites.

The key items identified for possible re-use are:

5.5.4.1 Bricks

The primary material identified on the site is bricks. These can often be re-used or re-sold. As there are no opportunities to re-use them in the future development, a brick reclamation yard should be contacted to investigate the feasibility of reclaiming and reselling the bricks.

5.5.4.2 Concrete

Assumed concrete foundations can be crushed on site and re-used as a piling matt on site

5.5.4.3 Internal fixtures, furniture and equipment

Any internal fixtures, furniture and equipment remaining in the building may be offered to charities. Organisation such as https://www.business2schools.com/ take unwanted office furniture and technology and donate it to schools. The amount of FFE left in the development is unknown at this point.

5.5.4.4 Ceiling Tiles

A number of ceiling tile manufacturers offer direct takeback/recycling services, which should be prioritised over external waste processors

5.5.4.5 Raised Access Flooring

The site has a significant amount of raised access flooring. Opportunities for re-use on the proposed development, or take back/recycling schemes should be reviewed. The state and integrity of the RAF will need to be reviewed, as it has a limited life cycle and must withstand structural loading.

5.5.5 Recycling

As the materials being removed from the site require specific processes to recycle, it is important that all the key materials are separated during strip out and demolition to ensure that recycling is possible. During strip-out and demolition, waste will be sorted on site into separate key waste groups on site and sent to the relevant recyclers. Any residual waste should be sent to a recycler, material recovery facility or waste to energy facility.

Waste containers should be clearly labelled. Signage should be provided to indicate each separate waste group that can be placed in the bin. Waste management procedures should be disseminated to site operatives during induction and throughout the project as a focus of toolbox talks.

Steel, glass and plasterboard on the site can be effectively recycled by a waste processor. Concrete and bricks that are not recycled may be able to be recycled on site for use as a low-grade aggregate, or alternatively can be recycled by an external waste processor.

Due to the site's location, there are a large number of potential waste and recycling facilities available, some of which have been listed in Table 3.2. It is recommended that recyclers are selected that achieve at least 95% diversion of material from landfill.

Company	Address	Website
Westminster Waste	Maybank Wharf, Herringham Road, Charlton, SE7 8NW	www.westminsterwaste.co.uk
LCM Scrap	Standard Industrial Estate, Factory Road, London, E16 2EJ	www.lcmscrap.com
Total Waste Management	Hovefields Avenue, Burnt Mills Industrial Estate, Basildon, SS13 1EB	www.totalwastemanagement.co.uk
McGrath Group	McGrath House, 62 River Road, Essex, IG11 0DS	www.mcgrathgroup.co.uk
RTS Waste Management	Plot 15 Manor Way Business Park Manor Way, Swanscombe, Kent, DA10 0PP	www.rtswaste.co.uk
Powerday	Brixton Waste Transfer Station, Belinda Road, London, SW9 7DT	www.powerday.co.uk

Table 3.2 – Identified local reprocessors or recyclers

5.5.6 Recovery

The majority of waste will have been prevented, re-used or recycled. Certain waste streams, such as some forms of timber or insulation, can be unsuitable for recycling. When managed correctly to minimise the release of any toxic fumes, waste incineration can minimise any environmental damage and recovery the energy contained within products.

Research has shown high quantities of wood from demolition sites is landfilled. Where reuse and recycling are not feasible, the carbon benefit form recovering the energy from wood products can be significant.

Insulation products can also be used for energy recovery. The bulk of these products often mean it unfeasible to transport them to the specialist recycling facilities required. Where recycling is not possible, polymer based products can be used for energy recovery, as polymers have a high calorific value.

In these cases, using the materials for energy recovery can be the most effective way to avoid landfill. However, prevention, reuse and recycling should always be prioritised over energy recovery.

As with recycling these waste streams should be separated and sorted on site. They can then either be sent directly to a waste-energy plant or sent to a recycler/reprocess that uses energy recovery to minimise any waste being sent to landfill. A number of the recyclers identified report that certain waste streams, such as timber or residual waste, are used for energy recovery.

5.5.7 Disposal

Hazardous materials will be safely disposed of in line with the Hazardous Waste Regulations 2016 and have been excluded from this report. Non-hazardous waste produced on site will always be assessed for handling following the waste hierarchy.

5.6 Meeting Minutes

Circular Economy Workshop - Meeting Minutes

Project: Avonmouth House

Location: Online (Microsoft Teams)

Date: 30/09/21

Attendees:

Attendee	Company
Louise Billingham	Stich Architects
Ethan He	Stich Architects
Nick Sava	Form Structural Design
George Nash	JAW Sustainability

1. Introduction to Circular Economy

- Summary of what a circular economy is, design consideration
- Review of New London Plan - Policy SI 7 Reducing waste and supporting the circular economy policy
- Review of Circular Economy Statement Draft requirements

2. Aspirations

Examples of:

- Organizational Circular Economy strategies/targets,
- Experience / past development Circular Economy achievements
- Development specific strategies and targets

3. Strategic Approach & Goals

Define an overall approach for each section of the development, justification for approach, set goals

Action:

- Existing building – former warehouse converted into offices, limited scope for refurbishment, does not effectively use the site. Opportunities to reuse/recycle to be discussed later
- New development – Separate approaches for employment/student
    - Employment – Adaptability – provided as open plan space, adaptable to different business needs
    - Residential – Longevity – permanent installation not intended for change

Municipal Waste – Limited control over residents waste production, development should encourage reduction and recycle of municipal waste

4. Commitments

Consider commitments for each one of the Core Principles below for each 'layer' of the development, Conserve resources, Design to eliminate Waste, Manage Waste:

Actions:

Conserve Resources

Structural:

- Foundation options to be reviewed at detailed design stage. Final design not to be conducted until later stage, where further soil testing and cost consideration has been conducted. Quantity of material to be minimise
- Flat slab RC superstructure design approach taken.
- Consider use of recycled aggregates and recycled binders. Exact amounts feasible are dependent on final structural design and specific loading of any element. To be reviewed at detailed design stage

Architect:

- Highly efficient fabric will be provided in line with energy strategy requirements
- Review opportunities to specify products with a high recycled content at the detailed design stage

Deign to eliminate waste

Structural:

- Crushed demolition waste can be used as a piling matt
- Robust RC frame designed to last the lifespan of the development, design life can be extended with sufficient maintenance
- As loading on student buildings is typically higher then on residential, the frame is inherently adaptable and suitable for refurbishment at the end of its life
- The size of transfer slabs is minimal, with consistent column location and setting out throughout the structure.
- RC frame provides inherent fire protection, rather than steel frame which requires regular painting and maintenance to provide good levels of fire protection.

Architect:

- Brick based external walls proposed, robust material
- Internal walls provided in the residential space, largely non-structural so can be refurbished if required to extended the life of the development
- Commercial spaces will be open plan with increased ceiling height to allow maximum adaptability

Manage Waste

- Largely responsibility of contractor, not appointed at this stage, should be reviewed at a later stage to

Structural:

- Material quantities to be well planned to minimise over ordering
- Opportunities to use demolition waste on site as a piling matt
- Consideration should be given to a top down construction method for the basements, which can reduce the amount of temporary works required. Feasibility dependent on final structural design, site/cost/schedule limitations.

Architect:

- Material quantities to be well planned to minimise over ordering
- Separate waste and recycling bins to be provided within the student units.
- Recycling bins to be provided in line with local authority requirements

5. Plans for implementation

How will commitments be implemented and monitored (Who, what, where, when)

Actions:

- Design team to review all commitments at detailed design stage
- Integrate material requirements into specification
- Review relevant commitments with contractor once appointed

6. End of Life Strategy

How the proposal's design and construction will enable building materials, components and products to be disassembled and reused at the end of their useful life?

Actions:

- Too early to consider in detail, requires more design work
- Frame is suitable for refurbishment at the end of tis life.
- Brick last longer then lifespan of development, can be re-used
- Frame crushed on site, rebar recycled