14 Blackburn Road, London Borough of Camden

Circular Economy Statement

14th March 2024

Version 1.2

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Contents

1 Introduction

1.1 Development Summary

This report summarises the waste and circular economy strategy for development at 14 Blackburn Road in order to meet the sustainability requirements of the London Plan and the Camden council.

The site is located in West Hampstead within the London Borough of Camden, to the northeast of West Hampstead station and is occupied by a builders' merchants (Builder Depot Limited 'BDL'). The site is located to the rear of properties fronting onto West End Lane in the heart of West Hampstead and extends east/west along Blackburn Road. The site abuts the railway to the south and is to the west of the allocated redevelopment site of the O2 Centre and car park. The proposal is for the demolition and redevelopment of the Site for a mixed-use development comprising purpose- built student accommodation (Sui Generis), affordable housing (Use Class C3), lower ground and ground floor flexible commercial/business space comprising of showrooms, retail and ancillary offices (Use Class E/Sui Generis) and a café/PBSA amenity space (Use Class E/Sui Generis) and associated works including service yard, cycle parking, hard and soft landscaping, amenity spaces and plant. The circular economy strategy was developed in collaboration with the applicant's design team and the applicant's development partner, Fifth State, following a virtual workshop held on 03/03/2025.The site location is showed in figure 1.1.

Figure 1-1 – 14 Blackburn Road site boundary

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.

1.3 Method Statement

This circular economy report was developed in line with the London plan policy SI 7, following the guidance outlined in "London Plan Guidance - Circular Economy Statement" document from March 2022. The circular economy strategy was developed in collaboration with the applicant's design team and the applicant's development partner, Fifth State, following a virtual workshop held on 18/10/2024. The workshop was attended by:

Name	Company
James McDonnell	Fifth state
Tobias Corry	HTA Architects
Maribel Mantecon	HTA Architects
Josh Stanton	CGP MEP
Henry Duncomb	Expedition
Matt Higgs	JAW Sustainability
Sreekanth Kumar	JAW Sustainability
Rishabh Patel	JAW Sustainability

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 goal of having no residual waste at all. Making this possible requires a 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 purpose built student accommodation, affordable housing, and commercial spaces. The site is currently occupied by a Builder Depot site, comprised of a series of showroom and sheds. The existing buildings have a limited capability for extension or for incorporation of the existing structures into any future development. There has been deemed no opportunity to reuse any of the buildings in situ. Further details of the existing building and its constituent materials are provided in the pre demolition audit.

The proposed strategy for the existing building on the development is to deconstruct and recycle the materials whilst encouraging reuse of materials wherever possible. A pre-demolition audit was conducted to identify the primary materials on the site; see this document (can also be found under appendix H) for further details of the existing building and the end-of-life strategy. The pre-demolition audit identified a number of possible opportunities to re-use materials elsewhere or recycle the primary materials currently on the site.

The proposed new development is a long-life development. The PBSA and residential 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 internal layouts fully designed to optimise the usage of the internal space, with spaces being fully fitted out as part of the construction. Priority will be given to materials that can be easily reused or recycled at the end of the project's life. Also, materials with a higher recycle content will be incorporated in the design. This approach ensures that the environmental impact is minimized while supporting a circular economy.

The commercial sections on the lower 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 provided as large open plan spaces to allow them 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's main plant but will not be fitted out to prevent unnecessary systems installation.

The strategic approach for both dealing with the existing buildings on site and for designing the proposed structure has utilised GLA flow charts known as Figures 4 and 5 found within the GLA guidance.

The entire building is a long-term development. Due to the high intensity nature of student accommodation, it is likely that regular maintenance will be required for building systems and fabric. They are unlikely to change use, although tenants are likely to change on a 1-3 year cycle. The affordable residential units will likely have more permanent tenants and are expected to require lesser maintenance when compared to the PBSA units. As such, spaces are designed firstly with longevity in mind, utilising hard wearing materials where possible. Internal and external walls are built in layers and in such a way to allow for easy disassembly and replaceability of user facing building layers (as these are the building layers most likely to be damaged by user activity). Additionally, building systems are designed in such a way that sections may be isolated, allowing for the disassembly of parts of the system for maintenance or replacement without affecting the operation of the remaining sections. Finally, the staggered occupation pattern of the PBSA sections of the development allows for regular maintenance of building systems and internal fabric without disruption to users. This enhanced maintenance will be carried out to prolong the longevity of building fabric and materials.

Recycled content will be maximised in all available areas of the development.

For further details on the above, please see the circular economy template provided as part of this submission.

3 Circular Economy Commitments

3.1 Circular Economy Narrative

Following a workshop with the design team, a number of key commitments and design strategies were identified to ensure the development contribute towards a circular economy.

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

These will be reviewed and updated at the detailed design stage once further details regarding the viability of specifying high recycled content materials has been adequately assessed. The focus will be on ensuring that materials with high levels of embodied carbon are reduced. As this building is proposed with an RC concrete frame, the grades of concrete used for each structural application, along with the level of cement replacement present in each, will be assessed to ensure the minimal levels of cement are used where possible. This will be explored further during a design stage 4 workshop.

Due to the nature of the development, consideration has been given to the use of a modular construction method rather than a conventional reinforced concrete frame building. This can provide a number of circular economy benefits, however further investigations into the cost and construction implications are required before any commitment is made. As such, this circular economy statement is based on the assumption that it will be a conventional reinforced concrete.

3.1.1 Conserve resources, increase efficiency and source sustainably

3.1.1.1 Minimise the quantities of materials used

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

- Prioritise pile foundations over raft foundations at the detailed design stage, as they typically use less material whilst providing a similar level of structural integrity
- The size and number of piles will be optimised to reduce material usage
- The slab will be optimised to balance concrete and reinforcement requirements
- Designs will be well rationalised to allow for minimal slab thicknesses throughout and to reduce or eliminate the need for transfer beams
- Openable windows are proposed throughout the scheme to limit any need for cooling
- Repetitive units have been stacked, and kitchens/bathrooms have been coordinated to minimise pipework runs
- Floor plates have been rationalised as much as possible to maximise material efficiency, with the number of different unit types kept to a minimum
- Options for post tensioned concrete structures will be further explored at stage 4 to determine viability. PT slabs are thinner and allow for longer spans with fewer columns
- Options for utilising a steel frame will be explored at the detailed design stage. In the eventuality that steel frames are utilised, all steelwork will be bolted rather than welded to ensure ease of reusability

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. Additionally, post tensioned slabs require specialist construction knowledge, which can increase both cost and project timeframe. 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 commercial site, which minimises the use of any undeveloped land, and the development is wholly on brownfield land
- The provision to extend the building vertically in the future, if required, has been considered to maximise the GIA available per GFA. Supplying maximum accommodation for students and residents whilst minimising the need for land use and LUC.
- Highly efficient building fabric will be specified to reduce energy demand in line with GLA targets, reducing energy use through the application of the energy hierarchy
- Highly efficient services to be specified to reduce energy consumption to meet GLA targets
- The development will meet the BREEAM water consumption requirements
- PV will be utilised throughout the scheme and maximised on all unused roof space. This will maximise on site generation and minimise additional energy demands stemming from the development.

The key challenges here will be site constraints and value engineering. For example, the site's small and linear footprint in comparison to the size of the proposed design makes the storage of materials on site difficult. This reduces the viability of the use of offcut bins for reducing construction waste and increases the number of deliveries required as individual deliveries must be smaller. Additionally, the proximity to the railway line and limited access from Blackburn Road limit site access for heavy plant and piling machinery. An energy strategy will be produced to ensure the building meets its energy efficiency requirements. 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:

- At the detailed design stage, a comprehensive structural review will be undertaken, which will consider the feasibility of beyond best-practice measures for specifying materials sustainability, such as:

  - Consider opportunities to use cement replacement materials in concrete, with products with up to 50% available in London. The amount of recycled binders in concrete should be maximised, subject to structural and cost considerations.
  - Consider the possibility of strength conformity at 56 days rather than the conventional 28 days. This could enable an increased amount of cement replacement.
  - Consider opportunities for the use of up to 20% recycled aggregate, especially in non-structural concrete.
  - Reinforcing steel should be specified with a high recycled content (95% or above).
  - Admixtures can be used to enhance sustainability credentials and reduce the ECO2 of concrete.
- Internal framing products, such as steel studs and plasterboard, are to be specified with a high recycled content.
- At the detailed design stage, the design team will review specifications to ensure that reused or recycled content of the materials specified is 20% by value of material.
- Opportunities to source materials locally will be prioritised.
- The external skin will be 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:

- At the detailed design stage, a comprehensive structural review will be undertaken, which will consider the feasibility of beyond best practise measures for increasing the flexibility and longevity of the building, such as:
  - Review the design life and consideration of designing for an extended design life
  - Review of potential maintenance methods extending the design life of the development
  - Review column layouts to maximise open plan spaces for the commercial section
- Brick external walls will be used which have a lifespan beyond the design life of the development. This should allow for recovery of masonry brickwork at the end of the building's lifecycle (subject to state of repair)
- Alternatively, a brick slip system will be utilised, which will allow for minimal material replacement in order to refresh facades.
- An overheating study was 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
- 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 decisions have/will be taken that minimise the quantity of waste generated by the development, such as:

- At the detailed design stage, a comprehensive structural review will be undertaken, which will consider the feasibility of beyond best practise measures for reducing construction and demolition waste, such as:
  - Crushed demolition waste will be used to level the site and for a piling mat
  - Modular or demountable construction methods, including precast concrete with high levels of concrete replacement
  - 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.
- Windows types have been kept to a minimum to minimise variation and waste caused by bespoke production
- A consistent material pallet has been used throughout the development to minimise the variation of waste types
- Services will be fully coordinated offsite prior to installation to maximise efficiency and minimise waste.
- Pre-fabricated bathroom units are used throughout the development. The use of prefabricated units significantly reduces pre-consumer waste from construction phases.

The key challenge here will be programming and coordination. Starting on site prior to design issues being resolved can lead to material wastage. Sufficient lead time will be provided to allow a fully coordinated 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 percent of construction and demolition waste should be diverted from landfills for reuse/recycling/recovery
- 95 percent of excavation should be put to beneficial use, such as landscaping, quarry infill etc. Opportunities to re-use or put to beneficial use should be considered
- Local waste processors that have a proven record of meeting GLA targets will be identified
- 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. A contractor will be appointed with sufficient time to review the design, and the circular economy commitments will be discussed with both 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 Operational Waste Management Plan

A draft operational waste management plan has been developed for the project. The same is detailed out in appendix G. Key strategies and steps have been discussed, along with an estimated weekly waste generated and floor plans to demarcate the store bins and their location with respect to service roads for easy waste collection.

3.2 Plans for implementation

The circular economy strategy will be reviewed by the design team throughout the process. 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 building's contributions to a circular economy should be considered.

3.2.1 Design Stage

At the detailed design stage (RIBA stage 4), a comprehensive structural review will be undertaken, which will consider the feasibility of beyond best practise measures such as:

- Investigation of post-tensioned concrete or precast slabs with void-formers
- Comprehensive review of slab thickness, reinforcement and column layout/size to maximise structural design efficiency
- Use crushed demolition waste to level site and for a piling matt
- Modular or demountable construction methods
- 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.
- Review the design life and consideration of designing for an extended design life
- Review of potential maintenance methods extending the design life of the development
- Review column layouts to maximise open plan spaces for the commercial section
- 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.
- Consider the possibility of strength conformity at 56 days rather than the conventional 28 days. This could enable you to increase the amount of cement replacements used.
- Consider opportunities for the use of up to 20% recycled aggregate, especially in non-structural concrete
- Reinforcing steel should be specified with a high recycled content (95% or above)
- Admixtures can be used to enhance sustainability credentials and reduce the ECO2 of concrete.

At the technical design stage, the architect & structural engineers shall review the commitment to specify at least 20% recycled products by value for all key materials, identifying opportunities to improve upon this. Commitments to the recycled content of any specific materials will be included in the specification.

3.2.2 Construction

Contractors shall be required to commit to waste targets outlined in the Circular Economy Strategy. Contractors will be required to submit drawings and submittals to ensure products meet with the specification.

Waste processors shall be selected that divert a minimum of 95% of waste from landfill.

Following the completion of demolition, the contractor shall be required to submit evidence that at least 95% of demolition waste was diverted from landfill.

Following the completion of excavation, the contractor shall be required to submit evidence that at least 95% of excavation waste was put to beneficial use.

Following completion of construction, the contractor shall be required to submit evidence that at least 95% of construction waste was diverted from landfills.

3.2.3 Handover & Use

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.

Regular review of bin store capacity should be conducted, and recycling capacity should be adjusted and increased in line with residents' requirements, with the aim of meeting the GLA target of 65% recycling rate by 2030.

The building managing agent shall submit the rate of municipal waste recycling following 1 year of full operation.

3.2.4 Post Completion Report

No less than 3 months following completion the contractor will provide a Post Completion Report to the local authority and GLA. The Post Completion Report shall provide revised versions of the tables outlined in the appendix of this report, comparing actual performance against predicted targets.

3.3 End-of-life (EOL) strategy

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

The first priority is to ensure that the building lasts beyond its design life. The proposed development is built out of a conventional reinforced concrete flat slab frame and brick external cladding, both of which are well established and robust materials. These materials, when properly maintained and looked after, can outlast the proposed design life of the development. The internal walls are also largely non-structural. As such, at the end of its design life, the PBSA sections building would be suitable for refurbishment and potentially even retrofitting into an alternative use if required, such as residential units or hotel rooms.

To aid 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.

When developing the design, the design team will prioritise the use of building elements that can be easily separated at the end of their life to facilitate re-use and recycling. This means avoiding composite materials wherever possible, using mechanical fixing rather than adhesive where possible etc. Opportunities to aid disassembly and deconstruction through design shall be reviewed by the design team at the detailed design stage. In order to aid deconstruction, during the design stage, the design team should prioritise:

- Minimise the building's complexity wherever possible by minimising material types and number of components.
- Minimise the number of fasteners while prioritising the use of mechanical fixing over adhesive. Make connections accessible.
- Use durable materials that are worth recovering.
- Avoid toxic materials and composite materials wherever possible.
- Provided comprehensive, accessible information on the building’s construction, including construction drawings & details.

The key EOL use of key materials is outlined below:

- Concrete – Concrete is by far the most significant material within the development. At the end of the frame’s life, it can be crushed and used as a recycled aggregate. Evidence from typical construction sites typically shows that almost all concrete is recovered for recycling into aggregate, with minimal amounts sent to landfill.
- Screed – can be crushed for use as backfill.
- Rebar - Steel is one of the most valuable materials for recovery. Rebar should be separated from crushed concrete and be recycled. When correctly separated, steel can be consistently recycled at a high value, again and again.
- Brick – Bricks are a durable material that outlast the life span of developments and can be suitable for re-use. However, demand for re-use bricks is typically below the supply; as such it is not always feasible for re-use. Where not re-used, bricks can be crushed and recycled into aggregate.
- Plasterboard – Plasterboard can be recycled, with the major manufacturers and suppliers offering take back schemes where waste plasterboard is recycled into new products.

4 Conclusion

This report summarises the waste and circular economy strategy for development at 14 Blackburn Road in order to meet the sustainability requirements of the London Plan and the Camden local council.

The site is located in West Hampstead within the London Borough of Camden, to the northeast of West Hampstead station and is occupied by a builders’ merchants (Builder Depot Limited ‘BDL’). The site is located to the rear of properties fronting onto West End Lane in the heart of West Hampstead and extends east/west along Blackburn Road. The site abuts the railway to the south and is to the west of the allocated redevelopment site of the O2 Centre and car park. The proposal is for the demolition and redevelopment of the site for a mixed-use development comprising purpose-built student accommodation (Sui Generis), affordable housing (Use Class C3), lower ground and ground floor flexible commercial/business space comprising of showrooms, retail and ancillary offices (Use Class E/Sui Generis) and a café/PBSA amenity space (Use Class E/Sui Generis) and associated works including service yard, cycle parking, hard and soft landscaping, amenity spaces and plant. This circular economy strategy was developed in collaboration with the design team and the developer following a virtual workshop. 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 will contribute towards a circular economy. These involve design decisions to minimise resources use, minimise waste and strategies to manage waste effectively. 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 have a limited capability for extension, or for incorporating the existing structure into any future development. Additionally, hard landscaping and substructural materials recovered on site will be reused as either back fill, for piling mats or as recycled aggregate. 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	PBSA/affordable housing Sections	Longevity	The residential section of the development is not intended for regular change and as such will primarily be guided by the requirement for longevity. 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	Workshops at design stage, post construction confirmation of implementation of design stage longevity measures
	Commercial Sections	Adaptability	The Commercial 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 utilising hardwearing materials. This will allow for the restructuring of the internal spaces to fit a multitude of uses with minimal construction work required.	95% diversion from landfill at end of life	Workshops at design stage, post construction confirmation of open plan floor plate in commercial sections of the development
Circular economy approach for municipal waste during operation	Municipal Waste	Recycle	The development will provide sufficient waste and recycling facilities in line with local authority guidelines	50% diversion from landfill at hand over, 65% by 2030	Review of design drawings to ensure that suitable space is available for

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	*N/A*	Piled foundations are prioritised over Raft as they typically use less material. Size and number of piles optimised to reduce material usage during stage 4 structural design review minimum level of cement replacement set to 20%	The slab will be optimised to balance concrete and reinforcement requirement. Rationalisation of building form and optimisation of column grid will be ensured throughout structural design to allow for slab minimisation. The option for reuse ofsteel within any steel framing applications will be explored further and prioritised where possible	Material wastage throughout construction will be minimised through effective material orders and on-site behaviour to ensure materials are not damaged on site, preventing use.	Cooling systems not to be provided in student spaces. Natural ventilation via Louvre + openable windows only. Units have been stacked and Kitchens / Bathrooms stacked to minimise pipework and ventilation ducting runs.	Floor plates will be rationalised as much as possible to maximise material efficiency in superstructural elements and MEP.	Standardisation in built in furniture minimises waste	Review opportunities to use temporary works as part of the permanent works	Ensure that unnecessary material is not used to meet the requirements of the building through standardisation, rationalisation and waste minimisation.	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	The use of recycled water will be maximised in all concrete applications, including the piled foundations. Precise levels will be determined by availability and the time of pouring and will be provided post construction	The use of recycled water within all concrete elements will be prioritised. Exact levels will be based on availability at time of use. this will be updated with exact quantities post construction.	Highly efficient building fabric will be specified to reduce energy demand in line with GLA targets. The use of reclaimed brick will be explored throughout design stage 4 through DTM to determine availability and viability. The use of reclaimed brick would offset virgin brick production saving both materials and energy.	Highly efficient services to be specified to reduce energy consumption to meet GLA targets The development will meet the BREEAM water consumption requirements of max 105 l per person per day	*Rationalisation of kitchens and student units will minimise pipe and ventilation stack runs, minimising energy use for pumps and fans*	*Wooden elements and furniture will feature high levels of recycled content, offsetting virgin production and preventing land use change and energy use*	*N/A*	Ensure other resource use will be kept to a minimum, primarily energy and water usage, however inclusion of recycled wood allows for some minimisation of LUC	Site constraints and value engineering. Site constraints	Variations from the original energy strategy should be checked to ensure the development still complies with its energy targets. Alterations to rationalised design should be avoided. Offsetting of virgin production is to be priorities	Water use calculations. As built EPCs
Specifying and sourcing materials responsibly and sustainably	*N/A*	Maximise use of recycled water within the concrete used throughout the RC piles. Exact levels will be based on availability at time of use. this will be updated with exact quantities post construction.	The use of high levels of recycled content / cement replacement within concrete will be pursued, a minimum target of 20% is conservatively outlined at this stage with in depth discussion to be held at detailed design to identify possible further measures	Bricks will be sourced as locally as possible based on the availability of the required brick stock. Possibilities to utilise reclaimed brick will be explored and prioritised based on availability	Opportunities to specify ducting/pipework with a high recycled content will be reviewed at detailed design stage	Internal framing products (steel) to be specified with a high levels of recycled material (target of 40%) to be explore at detailed design.	All timber will be FSC certified EPDs of products have been identified and collected. all wooden elements to contain high levels of recycled content	*N/A*	When specifying, materials with a high recycled content will be prioritised including concrete, steel and wood products.	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	*N/A*	Substructure is by its design the longest surviving element of most buildings. Minimisation of resource use will not undermine this	The development will use a RC frame which will last the life space of the development and can be extended with sufficient maintenance. The expected lifetime of the concrete frame is around 100 years.	Brick external walls will be used which have a lifespan beyond the design life of the development. Throughout the lifespan of the development, these will be maintained/ repointed as needed to ensure longevity and integrity. Masonry brick work is inherently deconstruct able and as such is utilised here, although this is currently minimally carried out within the industry. Areas of SFS and gypsum are demountable and allow external walls to be deconstructed at the end of the building's life cycle	An overheating study has been conducted to reduce overheating of the building in future climate scenarios. Building fabric and systems are designed to ensure that the building can remain functional and safe well into the future. In commercial spaces where regular charge of use is expected MEP is designed with this in mind to allow for flexibility within the space.	Internal walls to be provided in all student 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	*N/A*	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	*N/A*

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Designing out construction, demolition, excavation, Commercial and municipal waste arising	N/A	Use crushed demolition waste to level site and for a piling matt and aggregate where quality and quantity allows.	Rebar for RC frame fabricated offsite to minimise waste. The use of precast elements where possible to allow for minimal concrete waste	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 Building set out to brick dimensions to minimise brick cutting and wastage	Services will be fully coordinated offsite prior to installation.	Space has been allowed for municipal waste separation within shared sections (kitchens) of student units. Additionally, space is allocated in ground floor areas for recycling bins to allow for the collection of separated waste. Organic bins to be provided within units	Minimisation of waste from joinery through standardisation of design of both furniture and unit spaces as well as coordination of materials off site	Use of offcut bins on site and prioritisation of scrap usage where possible. Products with minimal packaging to be prioritised	Minimisation of waste through standardisation of design, off site coordination to prevent over ordering	Programming and coordination. Site constraints make material storage difficult.	Sufficient lead time will be provided to allow a fully co-ordinated design to take place.	*N/A*
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. Remaining rubble to crushed to aggregate for use as needed on site, the remaining waste will be used beneficially , crushed to aggregate for use of site to a minimum of 95%	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*				
Excavation waste	Excavation waste will be utilised on site of back fill where needed, as much additional excavation waste as possible will be put to beneficial use, up to a minimum of 95%	*Excavation waste to be used in substructure for back fill where viable* additional excavation waste as possible will be put to beneficial use, up to a minimum of 95%	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*				
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	*N/A*	Material suppliers will be required to taken back excess material and packaging material		Programming	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 Recycling and Waste Reporting table on competition
Municipal and Commercial waste	Waste and recycling storage to be provided in the residential units Easily accessible storage to be provided Bin store to provide at least 65% of its capacity to recycling to allow for 2030 target achievement	*N/A*	*N/A*	*N/A*	*N/A*	Space has been allowed for municipal waste separation within shared sections (kitchens) of student units. Additionally, space is allocated in ground floor areas for recycling bins to allow for the collection of separated waste. Organic bins to be provided within units	*N/A*	*N/A*				

5.3 Appendix C – Bill of Materials Reporting

See Attached GLA CE statement template for full bill of materials

5.4 Appendix D – Recycling and Waste Reporting

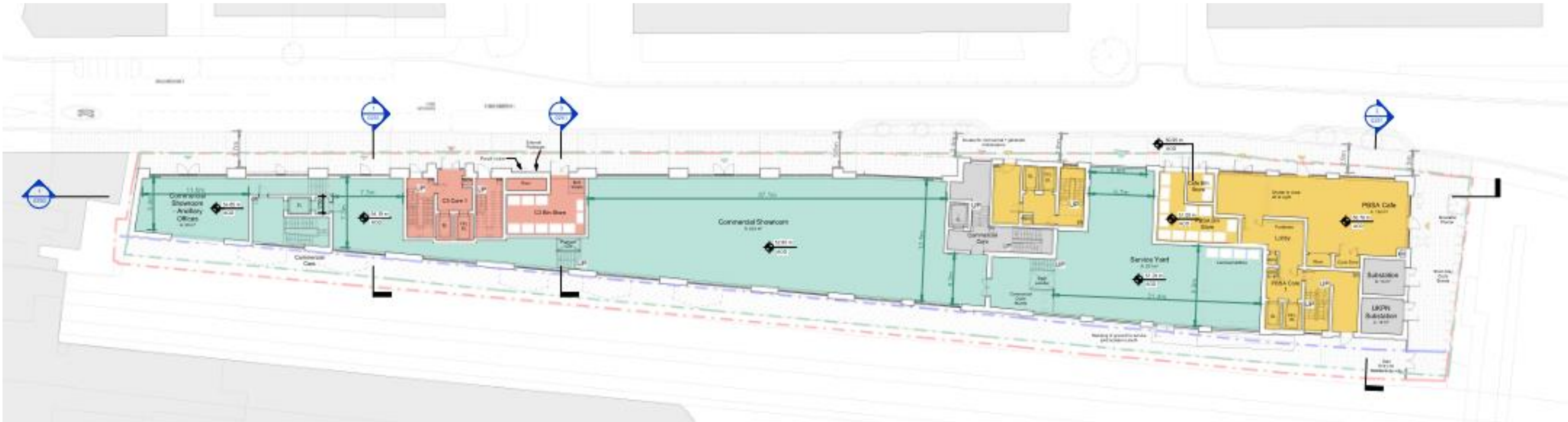
<table>
<tr><th rowspan="2"></th><th rowspan="2">Total Estimate (t/m2 GIA)</th><th rowspan="2">% reused or recycled onsite</th><th rowspan="2">% reused or recycled offsite</th><th colspan="2">% no reused or recycled</th><th rowspan="2">Source of information</th></tr>
<tr><th>% to landfill</th><th>% to other management</th></tr>
<tr><td rowspan="2">Excavation waste</td><td rowspan="2">0.458</td><td rowspan="2">10%</td><td rowspan="2">85%</td><td colspan="2">5%</td><td rowspan="2">Estimate 1.5 tonnes per m3 excavated</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">Demolition waste</td><td rowspan="2">0.097</td><td rowspan="2">-</td><td rowspan="2">95%</td><td colspan="2">5%</td><td rowspan="2">Based on pre demolition audit</td></tr>
<tr><td>-</td><td>5%</td></tr>
<tr><td rowspan="2">Construction waste</td><td rowspan="2">0.111</td><td rowspan="2">10%</td><td rowspan="2">85%</td><td colspan="2">5%</td><td rowspan="2">Based on bill on materials reported in the CE spreadsheet</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">318</td><td rowspan="2">-</td><td rowspan="2">65%</td><td colspan="2">35%</td><td rowspan="2">Estimate based on DEFRA statistics of waste in LA and regional waste statistics spreadsheet (343.5 kg per person)</td></tr>
<tr><td>10%</td><td>25%</td></tr>
<tr><td rowspan="2">Commercial 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 Appendix E – Construction Waste final destination

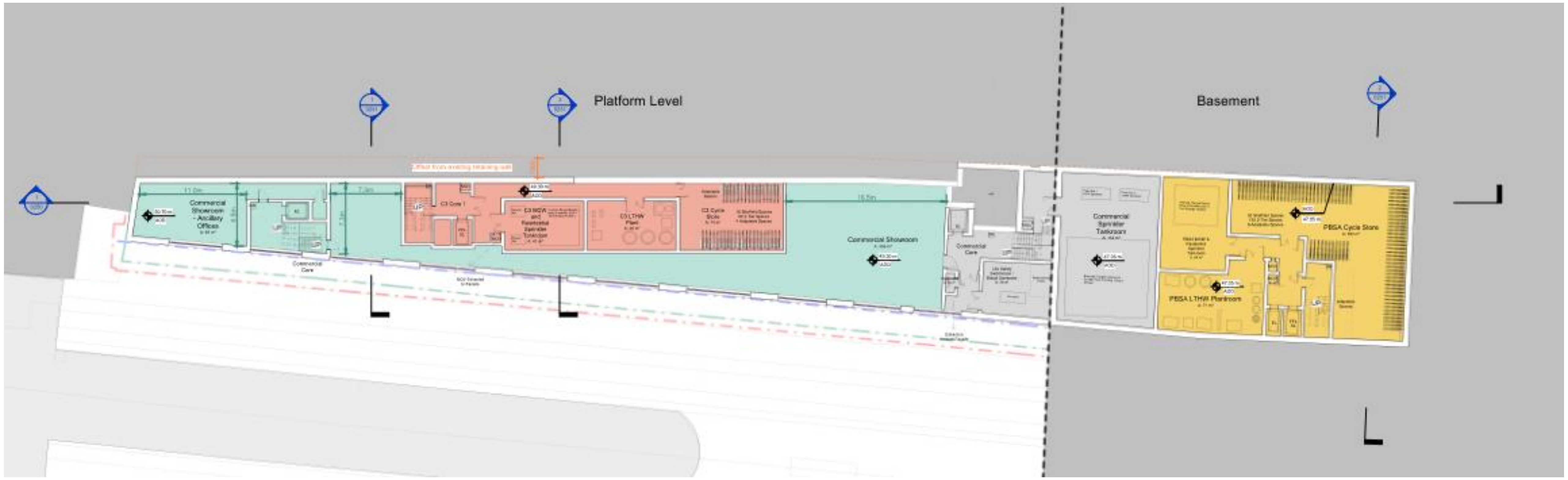
Waste Category	European waste code	Disposal site name and address	Type of site	EOL process
Wood / Wood Grade A	17.02.01	Fibre Fuels Environment Edinburgh Way, Slough, SL1 (Energy Recovery) MVV Environment Ridham Ltd Lord Nelson Road, Iwade, Sittingbourne ME9 8FQ EON UK, Stevens Croft Plant, Lockerbie, Scotland Norbord Europe Ltd, Station Rd, Cowie, Stirling, FK7 7BQ	Biomass Power Plants Recycling	Burnt and converted into energy. Timber recycling
Plasterboard	17.08.02	Plasterboard Recycling Solutions Ltd 1 Mill Lane, Wingrave Aylesbury, Bucks, HP22 4PL Countrystyle, Ridham Dock, Iwade, Sittingbourne, ME9 8SR	Separation and recycling	Plasterboard recycling
Mixed construction and demolition	17.09.04	Plasterboard Recycling Solutions Ltd 1 Mill Lane, Wingrave Aylesbury, Bucks, HP22 4PL Countrystyle, Ridham Dock, Iwade, Sittingbourne, ME9 8SR	Recycling and Recovery	Waste separated and recycled. Non-recyclable waste incinerated to provide energy
Mixed metals	17.14.07	Metal and Waste Recycling, Oxestalls Road,, SE8 3QSBFA Recycling, New Years Green Lane UB9 6LXEMR, 106 Scrubs Lane London, NW10 6QYTotal Waste Ltd, Hallfield Ave, Basildon, SS131EBCapital Metal Recycling, Scrubs Lane London NW10 6QY	Recycling and reuse	Metal recycling
COSHH	17.09.03	Wastecare, 4-10 Atcost Road, Barking, IG11 0EQ.	Incineration	Waste incinerated to provide energy
Inert	17.05.04	Mick George 6 Lancaster Way, Ermine Business Park, Huntingdon,,PE29 6XU	Environmental Protection Layer	
Refuse derived fuel	19.12.10	Weener (Germany), Geminor (Sweden) AVR (Holland)	Energy from Waste Cement Production	Energy from Waste Cement Production

Plastic	15.01.02	Repro Plastics Ltd, Coopers Yard Radclive Road, Gawcott, Bucks, HP15 7TZ	Recycling and Reuse	Plastic recycling and reuse
Soft plastic	15.01.02	Nevis Resources/ Wexpool Sp.Z o.o 14a Poznanska, Poznan, 66-210, Poland	Recycling and Reuse	Plastic recycling and reuse
Hard plastic	15.01.02	Plastic Reclamation, Whitley Bay, NE25 8BL	Recycling and Reuse	Plastic recycling and reuse
UPVC	15.01.02	VEKA Systems, Manor Way, Swanscombe, DA10 0LL	Reuse	UPVC reuse
Cardboard	20.01.01	Cyclelink UK 6 Lords Court Basildon, Essex, SS13 1SS Smurfitt Kappa Recycling Ltd, Snodland Depot, Mill Street, Snodland, Kent, ME6 5AX Bolton Brothers, Bramford Road, Great Blakenham Ipswich, IP6 0SL	Recycling	Cardboard recycling
Mattresses	20.03.07	Matt UK, Landsmann Way, Deptford, London, SE14 5RS	Recycling	Mattress recycling
Asbestos	17.06.05	Unknown at this stage to be determined once waste contractor is established.	Mono-Cell Landfill	Landfill. Landfill has capacity to process 500000 tons of waste every year

5.6 Floor plans and elevations



Ground floor plan



Basement floor plan

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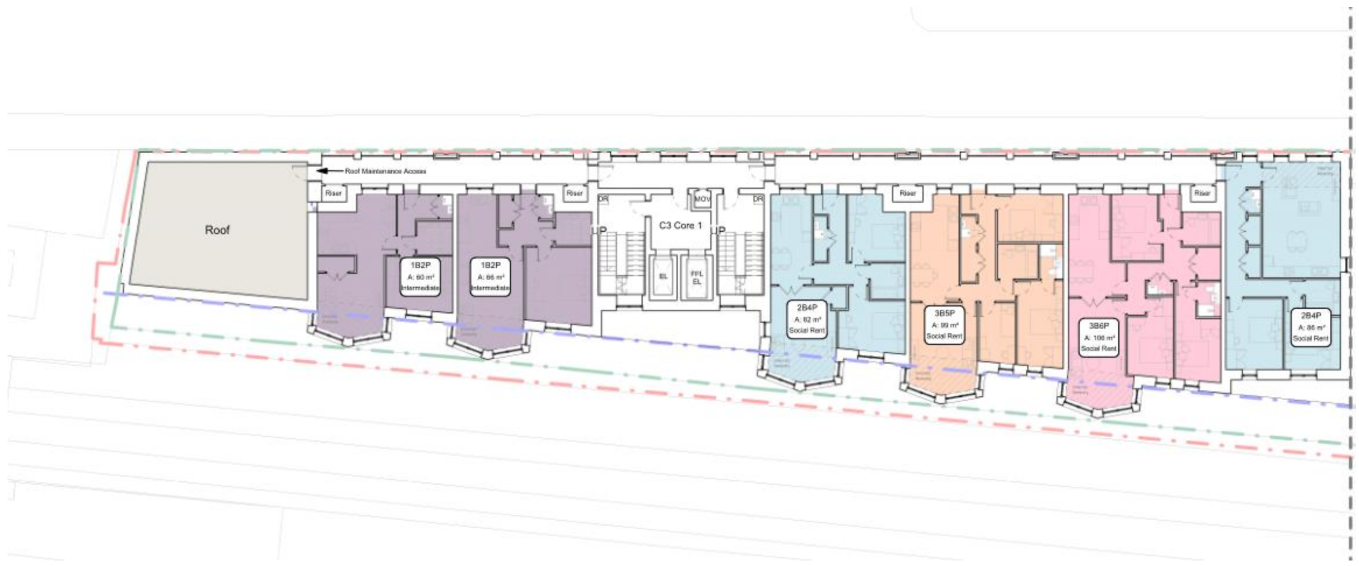
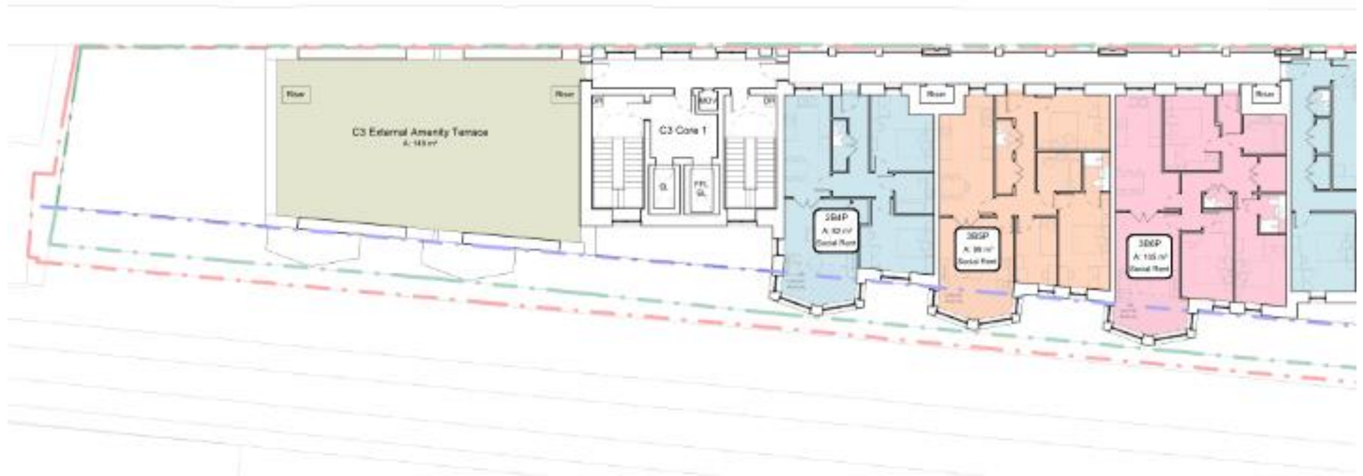
C3 housing 1st floor plan



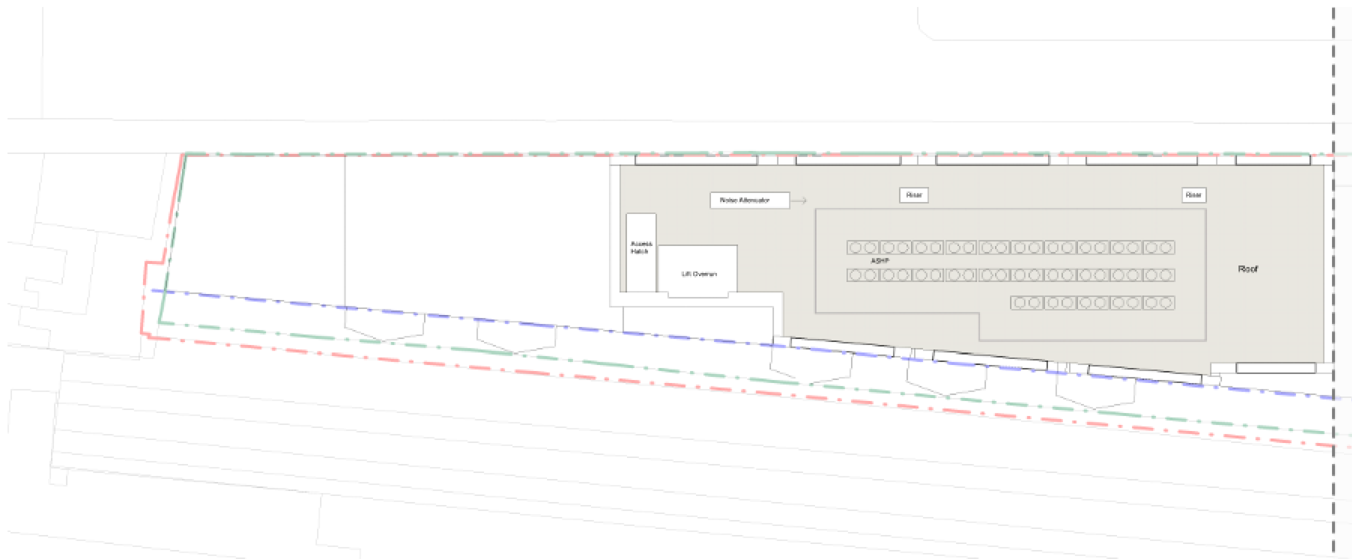
C3 housing 5th floor plan

C3 housing 2nd – 4th floor plan



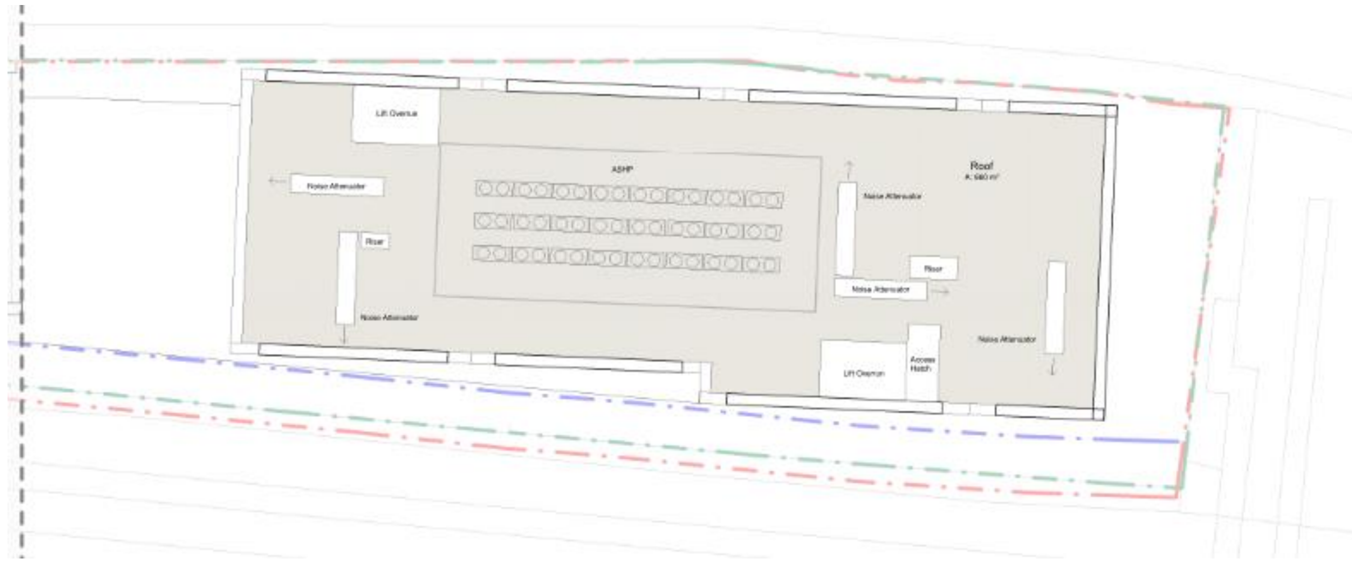
C3 housing 6th floor plan

PBSA 1st floor plan



C3 housing roof plan

PBSA 2nd-8th floor plan



PBSA roof plan

North elevation

South elevation

5.7 Appendix G – Operational waste management plan

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:

- Operational waste will be managed in line with the waste hierarchy. Building management should focus on preventing waste, then option for re-use, and maximising recycled by the occupants.
- Mixed dry recycling will be collected as a co-mingled collection, with a provider selected that can provide collection of Glass, Cardboard/Paper, Plastics and Metals/Cans.
- Separate waste bins should be provided within each cluster to facilitate easy separation of waste by the residents.
- Options for food waste recycling will be provided, with bins located in each cluster and provision in the bin store for food waste.
- Bin rotation will be managed by building managers to ensure all bin storage areas are shared and easy to access both for, these spaces are additionally designed
- Bin store use should be monitored by building management to check if 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.
- The development commits to trying to meet the GLA recycling target of 65% by 2030
  - Bin use will be reviewed by building management, with the aim of increasing recycling provision to meet GLA target of 65% by 2030
  - Guidance should be provided to residents on what can and can't be recycled, with the aim of increasing recycling to the point that 65% of municipal waste is recycled by 2030
- Similarly, the commercial sections of the development will be committed to meeting the 75% minimum target for business waste recycling by 2030 (as required by London Environment Strategy Policy)
- The managing operator will monitor waste provision, however, they are not known at this point. They should carry out annual reviews and aim to reduce operational waste, as well as adjust bin provision to meet GLA recycling targets.
- Mixed dry recycling will be collected as a co-mingled collection, with a provider selected that can collection Cardboard/Paper, Plastics, Metals/Cans and glass.

Waste storage requirement is calculated using equation for weekly waste arising from Table 3.1 of BS5906:2005. As per BS5906:2005, The recommended storage to be allocated for recyclable waste should ideally be 30% of total waste output by weight or 50% by volume of waste.

Equation for weekly waste arisings: number of dwellings × {(volume arising per bedroom [70 l] × average number of bedrooms) + 30}. This development includes 324 bedrooms across 192 PBSA and 35 affordable units.

PBSA recycling and refuse

	Total waste per week	Proposed bin
Total Waste	13,440 litres	12 x 1280 L wheelie bins
General waste (50% of total)	6720 litres	6 x 1280 L wheelie bins
Recycle bin (50% of total)	6720 litres	6 x 1280 L wheelie bins

C3 recycling and refuse

	Total waste per week	Proposed bin
Total Waste	9,905 litres	8 x 1280 L wheelie bins 2 x 500 L bins
Refuse	4200 litres	4 x 1280 L wheelie bins
Mixed recycling	4900 litres	4 x 1280 L wheelie bins
Food waste	805 litres	2 x 500 L wheelie bins

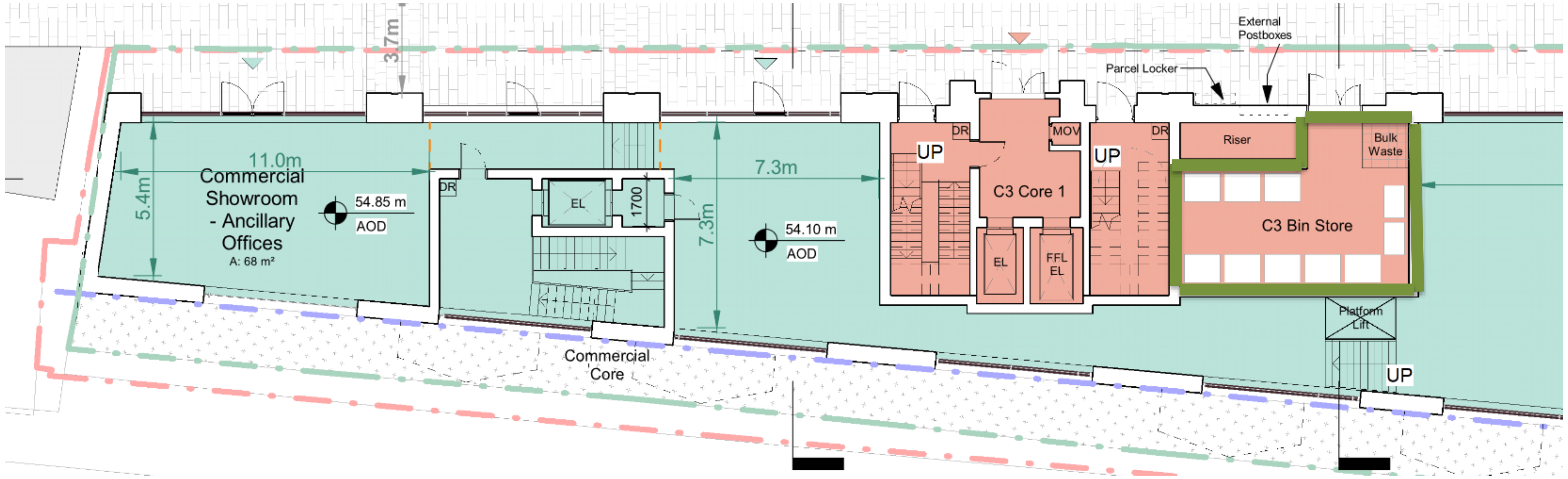
Furthermore, the bin stores are design for easy access for residents of the building including efficient disabled access.

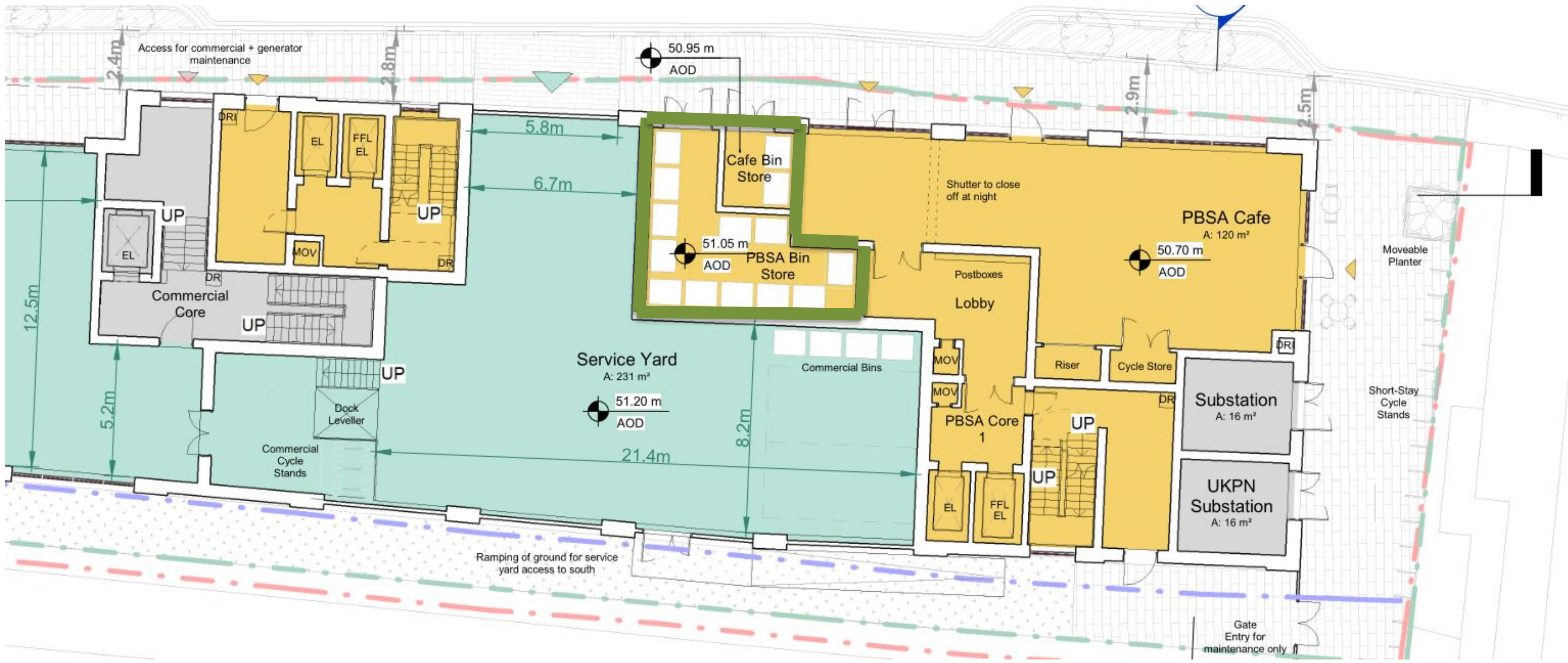
The non-residential sections of the building will mainly cater to Commercial use and expected waste will be mainly dry recyclable waste. The waste stores will follow similar pattern to the residential waste stores, however as the exact occupancy rate of the non-Commercial space is not known at this point, the number and split of bins have not been allocated.

Operational performance monitoring

Operational waste will be monitored and reported by a waste management operative. They will responsible for the operation and improvement of the waste management in the building. At this stage the waste operative has not been appointed and this information will be updated on appointment. The waste operative in charge will be encouraged to use smart waste monitoring software and logistics to handle all waste generated

Bin store locations





5.8 Appendix H – Pre-demolition audit

5.8.1 Introduction

5.8.1.1 Objectives

This pre-demolition audit establishes which materials are currently present in the building and identifies opportunities for re-use and recycling of these materials. The results should be used to guide the design, consideration of materials that can be re-used, and to set targets for waste management and ensure all contractors are engaged in the process of maximising high-grade re-use and recycling opportunities.

This audit covers:

- Identification and quantification of the key materials where present on the project
- Potential applications and any related issues for the re-use and recycling of the key materials in accordance with the waste hierarchy
- Requirements for the selection of local reprocesses or recyclers for recycling of materials
- Identification of overall recycling rate for all key materials
- Identification of re-use targets where appropriate
- Identification of overall landfill diversion rate for all key materials

5.8.1.2 Project overview

This is a pre-demolition audit for the redevelopment of 14 Blackburn Road, London, NW6 1RZ, West Hampstead, London Borough of Camden. The site is currently occupied by a Builder Depot site, comprised of a series of showrooms and sheds. The components and materials in the existing buildings are in relatively poor condition, and therefore, there is limited potential for their direct reuse. The potential for reclaiming the existing bricks on site will be explored at later stages, however, the existing bricks do not meet the design criteria of the proposal, and therefore, direct reuse is not possible. There is also limited capability for the extension or incorporation of the existing structures into any future development.

The proposal is for the demolition and redevelopment of the Site for a mixed-use development comprising purpose-built student accommodation (Sui Generis), affordable housing (Use Class C3), lower ground and ground floor flexible commercial/business space comprising of showrooms, retail and ancillary offices (Use Class E/Sui Generis) and a café/PBSA amenity space (Use Class E/Sui Generis) and associated works including service yard, cycle parking, hard and soft landscaping, amenity spaces and plant. The primary materials identified within this pre-demolition audit are:

- Ready mix concrete
- Reinforcement rebar
- Corrugated steel sheets (façade)
- Red brick
- Concrete masonry block
- Steel column
- Steel beams
- Timber beams
- Gypsum plasterboard
- Steel framing profiles
- Corrugated steel roof
- Corrugated GRP rooflight sheets
- MDF ceiling board
- Timber truss
- Steel truss

Figure 1 – 14 Blackburn Road site boundary

5.8.2 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 2-1.

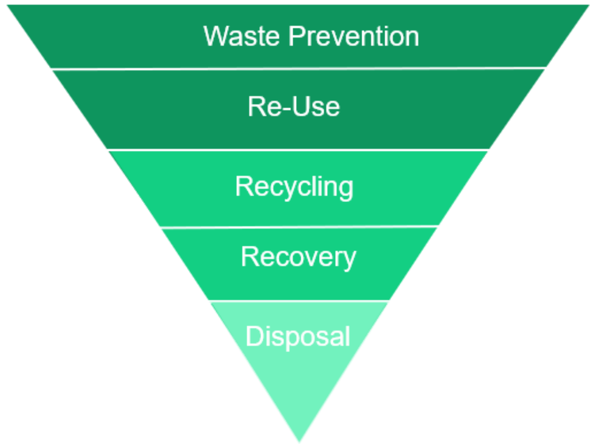


Figure 2-1 The Waste Hierarchy

5.8.2.1 Waste Prevention

The development comprises of the demolition of multiple existing buildings. Initial surveys of the building suggest that the existing warehouses and other structures on the site are nearly 150 years old and in very poor condition. Therefore, the direct reuse of any existing structures or materials on site is extremely limited. As such the best course of action is the recycling of said materials. As a result, any waste prevention is likely to be achieved through off-site re-use as outlined below.

5.8.2.2 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.

Bricks

There may be scope for the bricks of the newer building on site to be reclaimed and reused, a suitable brick reclamation yard should be contacted to investigate the feasibility of this. There is typically excess supply of reclaimed bricks currently, so it may not be possible, particularly given the damage sustained by many of the bricks. However, as interest in utilising reclaimed brick grows due to the inherent embodied carbon savings derived from the practice, this option warrants further investigation. As such a reserved estimate of 5% reuse has been applied to bricks present within the existing building. This figure may be revised at later design stages dependant on the viability of brick reclamation closer to demolition.

5.8.2.3 Recycling

During demolition, the waste should be sorted on site into separate key waste groups and sent to the relevant recyclers. Once selected, the details of the responsible waste carrier(s) for structural demolition will also be listed in the table below. A provisional avoidance from landfill rate of 95% has been agreed and stipulated as a tender requirement for the selection of the waste handler(s).Once appointed, the details of the responsible waste carrier(s) will be detailed below.

Company	
Address	
Website	

Material	Re-use (%)	Recycle (%)	Recovery (%)	Landfill diversion (%)
Binders	0	90	5	95
Bricks	5	85	0	95
Concrete	0	95	0	95
Electrical	0	40	55	95
Glass	0	95	0	95
Gypsum	0	95	0	95
Metals	0	95	0	95
Plastics	10	85	0	95
Timber	0	95	0	95

Table 2-1 – Assumed waste end use rates

Concrete

There is a significant quantity of concrete on site, comprising the site's indoor flooring, courtyard, blockwork walls and first floor slabs. Due to the site's drastic development transformation, the entirety of the slab and substructure will need to be removed prior to excavation for the new, increased substructure and basement. It is advisable to utilise the existing substructure as an 'aggregate quarry' to utilise on site for concrete pouring and piling mats.

Metals

Metals, such as rebar, columns, truss and beams can be easily recycled with no loss of quality. Metals within the existing building are largely limited to reinforcements within concrete, beams, roof trusses, columns and framing for internal partitions. The corroded nature of these steels may preclude their use in structural applications within the proposed building.

Electrical

Electrical items often contain high value materials and as such their recycling is a priority. However, these elements are often encased by or combined with other materials. It is therefore a relatively difficult to reach high recycling rates for electrical waste. However, a 95% electrical waste avoidance from landfill rate has been set for the project.

Gypsum

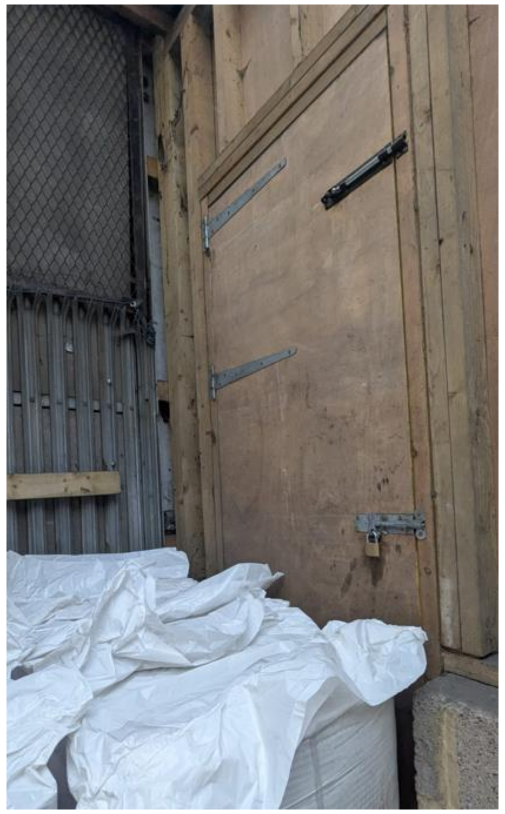
Several interior walls, partitions and ceilings have a layer of gypsum plasterboards, such as in the first floor showroom. Gypsum is 100% recyclable without any loss in quality and thus the entire quantity of waste gypsum can be easily and efficiently recycled.

5.8.2.4 Recovery

The majority of waste will have been prevented, re-used or recycled. Where materials cannot be recycled, they can be used for energy recovery in waste to power plants.

Timber

The site contains significant amount of timber from the timber framing systems, plywood wall boards, internal and external doors and staircase railings. It is not possible to reuse the timber present in the existing structure and it will be used for energy recovery.



5.8.2.5 Disposal

Hazardous materials will be safely disposed of in line with the Hazardous Waste Regulations 2005 (amended 2016) and have been excluded from the quantification in this report. Non-hazardous waste produced on site will always be assessed for handling following the waste hierarchy.

5.8.3 Quantification

The items and materials present in the building have been estimated by volume and categorised by European Waste Catalogue (EWC) category in order to calculate tonnage of each material, with results shown in Figure 3.2. The remaining waste has been assigned re-use, recycling, recovery and landfill diversion rates. The full calculation table can be seen in Appendix Table 4.1.

Quantification is based on estimates and has been used to guide decision for key material groups. Final material quantities are likely to vary significantly form estimates outlined below. Sand and soil has been excluded from the quantification, as amount of excavation & levelling work was not known at the time.

A summary of results and re-use, recycling, recovery, and total landfill diversion targets are shown in Table 3-1 and Figure 3-1. They show that this project is targeting a landfill diversion rate of 95% in the majority of waste groups. Upon the appointment of a waste contractor, the targeted rate will be expected to be met or bettered.

EWC Group	Weight (tonnes)	Re-used Target (tonnes)	Recycled Target (tonnes)	Recovered Target (tonnes)	Landfill Diversion Target (tonnes)	Re-used Target (%)	Recycled Target (%)	Recovered Target (%)	Landfill Diversion Target (%)
Metals	4,258.39	425.84	3,619.63	0.00	4,045.47	5	90	0	95
Gypsum	32.20	0.00	30.59	0.00	30.59	0	95	0	95
Timber	34.95	0.00	0.00	33.20	33.20	0	0	95	95
Concrete	5,017.00	0.00	4,766.15	0.00	4,766.15	0	95	0	95
Tiles and ceramics	0.24	0.00	0.23	0.00	0.23	0	95	0	95
Binders	0.06	0.00	0.05	0.00	0.06	0	90	5	95
Electrical	4.36	0.00	1.75	2.40	4.15	0	40	55	95
EPS Insulation	1.44	0.00	1.37	0.00	1.37	0	95	0	95
Glass	0.30	0.00	0.29	0.00	0.29	0	95	0	95
Bricks	150.00	7.50	135.00	0.00	142.50	5	90	0	95

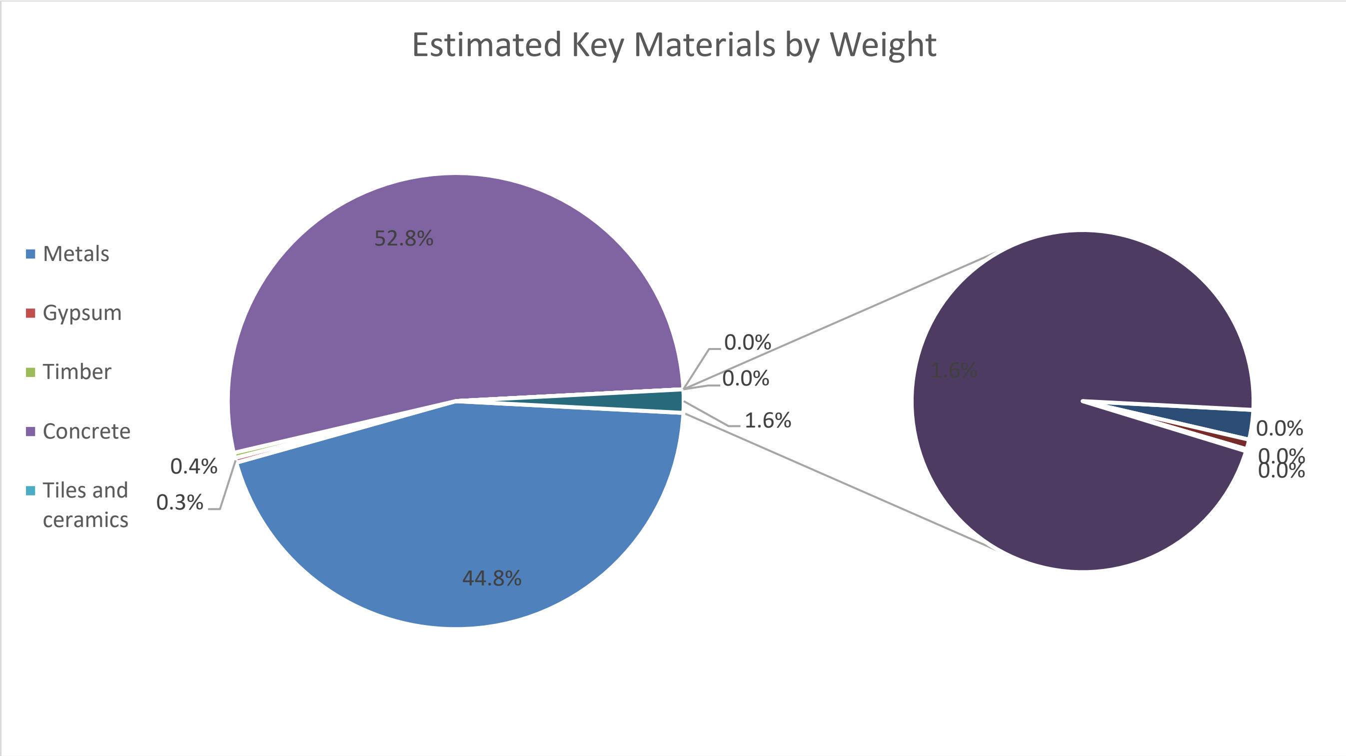


Figure 3-1 – Estimated materials by weight

Appendix 1 – Full Material Calculations

Item	European Waste Catalogue	Total Weight (tonnes)	Direct Re-Use (%)	Direct Re-use (tonnes)	Remaining Waste (tonnes)	Recycler	Re-used (tonnes)	Recycled (tonnes)	Recovered (tonnes)	Landfill Diversion (tonnes)
Ready mix concrete	Concrete	4897.00	0.00	0.00	4897.00	0.00	0.00	4652.15	0.00	4652.15
Red brick	Bricks	150.00	0.00	0.00	150.00	5.00	7.50	135.00	0.00	142.50
Mortar	Binders	0.06	0.00	0.00	0.06	0.00	0.00	0.05	0.00	0.06
Concrete masonry block	Concrete	120.00	0.00	0.00	120.00	0.00	0.00	114.00	0.00	114.00
Structural steel	Metals	3983.20	0.00	0.00	3983.20	10.00	398.32	3385.72	0.00	3784.04
Galvanised steel sheet	Metals	11.10	0.00	0.00	11.10	10.00	1.11	9.44	0.00	10.55
Reinforcement rebar	Metals	263.80	0.00	0.00	263.80	10.00	26.38	224.23	0.00	250.61
Timber	Timber	27.60	0.00	0.00	27.60	0.00	0.00	0.00	26.22	26.22
Plywood	Timber	6.88	0.00	0.00	6.88	0.00	0.00	0.00	6.54	6.54
Gypsum plasterboard	Gypsum	2.20	0.00	0.00	2.20	0.00	0.00	2.09	0.00	2.09
GRP rooflight	Plastics	0.53	0.00	0.00	0.53	0.00	0.00	0.50	0.00	0.50
Screed	Sand and Soils	25.00	0.00	0.00	25.00	95.00	23.75	0.00	0.00	23.75
EPS insulation	Insulating Materials	1.44	0.00	0.00	1.44	0.00	0.00	1.37	0.00	1.37
Gypsum plaster	Gypsum	30.00	0.00	0.00	30.00	0.00	0.00	28.50	0.00	28.50
Vapour control membrane	Plastics	0.04	0.00	0.00	0.04	0.00	0.00	0.03	0.00	0.03
Timber stairs	Timber	0.20	0.00	0.00	0.20	0.00	0.00	0.00	0.19	0.19
metals steps	Metals	0.29	0.00	0.00	0.29	10.00	0.03	0.25	0.00	0.28
PVC frame window	Glass	0.13	0.00	0.00	0.13	0.00	0.00	0.12	0.00	0.12
Doors	Timber	0.27	0.00	0.00	0.27	0.00	0.00	0.00	0.26	0.26
Aluminium frame window	Glass	0.17	0.00	0.00	0.17	0.00	0.00	0.16	0.00	0.16
Laminate Flooring	Plastics	0.25	0.00	0.00	0.25	0.00	0.00	0.24	0.00	0.24
Sanitary ware	Tiles and ceramics	0.24	0.00	0.00	0.24	0.00	0.00	0.23	0.00	0.23
Electrical systems	Electrical	4.36	0.00	0.00	4.36	0.00	0.00	1.75	2.40	4.15

Table 4-1 – Full results table

Appendix 2 – Site pictures