Confidential

Circular Economy Statement
Thames Young Mariners

Surrey County Council

R001HSM – 01

07/08/2023

PICK EVERARD | Deliver better together.

Document History

Issue	Date	Comment	Author	Chk'd
01	07/08/2023	S2(2) For Issue – additionally for Planning	HSM	TNR

SURREY
COUNTY COUNCIL

SOLD
Surrey Outdoor
Learning & Development

Contents

1. Executive Summary

This Circular Economy Statement has been produced by Pick Everard, on behalf of Surrey County Council, demonstrating compliance with the requirements set out in the GLA London Plan Policy SI 7 *'Reducing waste and supporting the circular economy (CE)'*. The GLA 'Circular Economy Guidance' document published in March 2022 was used as the basis for this report.

The statement supports the full planning application of the redevelopment of the Thames Young Mariners outdoor centre in Surrey. The proposal is for the demolition of existing buildings and construction of replacement buildings with associated residential accommodation, changing block, replacement of staff accommodation and outdoor activity equipment including high ropes, climbing wall, coasteering course, supporting pontoons with associated hard and soft landscaping and parking.

This statement was developed in conjunction with the design team and developer, with a workshop hosted on Wednesday 17th May 2023. The workshop led to a strategic approach being defined for the existing buildings, proposed new development and the approach to waste.

Throughout this report, key commitments and targets have been identified to ensure the project will contribute towards a circular economy. The 6 core principles have been addressed, which are:

- Building in layers
- Designing out waste
- Designing for longevity
- Designing for adaptability or flexibility
- Designing for disassembly
- Using systems, elements or materials that can be reused and recycled

2. The Circular Economy

The Ellen MacArthur Foundation defines a circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use and regenerating natural systems. By contrast, a traditional linear economy is based upon the principles of 'take, make, break and discard'.

The built environment has a major role to play in creating a circular economy. The UKGBC find that in the UK alone, construction, demolition and excavation account for 60% of material use and waste generation. By moving to a circular economy, the built environment can reduce the need for finite resources and raw materials. Figure 1 outlines the circular model.

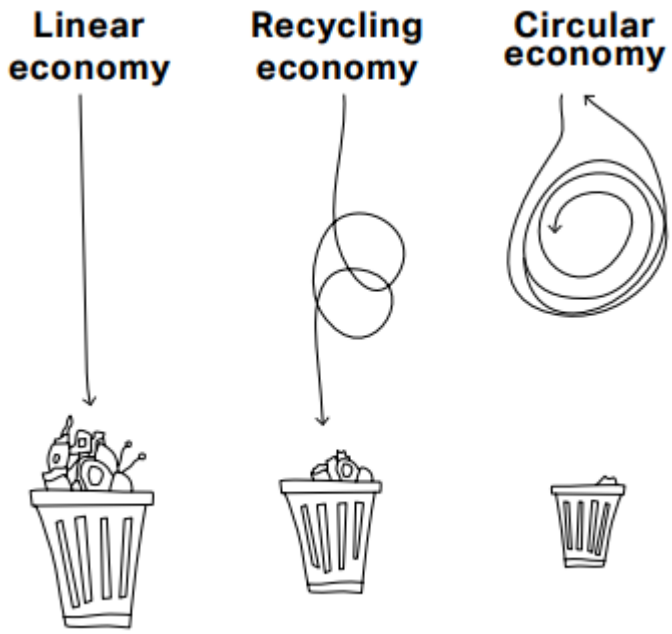


Figure 1 - The Circular Economy. Source: Circular Flanders

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

Essential elements of Circular Economy statement are listed below:

- How all materials arising from demolition and remediation works will be reused and/or recycled.
- How the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and reused at the end of their useful life.

- Opportunities for managing as much demolition, excavation, construction, and operation waste as possible on-site.
- Adequate and easily accessible storage space and collection systems to support recycling and reuse during operation.
- How much waste the demolition, construction and operation phase of the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy.
- How performance will be monitored and reported, during the demolition, excavation, construction, and operation phases.

3. Introduction

3.1 Description of Site

The site is located in Richmond, owned by Surrey Outdoor Learning and Development (SOLD).

Thames Young Mariners Outdoor Education Centre
Riverside Drive
Ham
Richmond
Surrey
TW10 7RX

Figure 2 - Site location.

Figure 3 - Proposed site layout.

3.2 Development Summary

This support provides the Circular Economy Statement, in line with requirements outlined by the GLA, and should be read in conjunction with the excel spreadsheet that has been provided by the GLA.

The proposal is for the demolition of existing buildings and construction of replacement buildings with associated residential accommodation, changing block, replacement of staff accommodation and outdoor activity equipment including high ropes, climbing wall, coasteering course, supporting pontoons with associated hard and soft landscaping and parking. The existing buildings on site are not suitable for redevelopment and are therefore being demolished as part of the proposed works.

Existing Buildings	**Gross Internal Area (m^2)**
E1	502.77
E2	434.56
E3	82.23
E4	73.67
E5	188.26
A1	514.37
TOTAL	**1,795.86 m^2**

Proposed Buildings	Total Area (m^2)
Building 1 (Main Building)	1,009
Building 2 (Guest Residential)	765
Building 3 (Camping Block)	200
TOTAL	**1,974 m^2**

3.3 Policies

In the production of this Circular Economy Statement, the following policies have been reviewed:

- The London Plan
- SOLD Environmental Sustainability Policy
- Richmond Council Local Plan 2018
- Ham and Petersham Neighbourhood Pan 2019
- Ham Lands Local Nature Reserve
- London Borough of Richmond Upon Thames Biodiversity Plan
- BREEAM New Construction 2018 – 'Excellent' rating.
- Social Value Charter Template

3.4 Method Statement

The production of this statement was an outcome from the Circular Economy Workshop held on 17th May 2023, with attendees from the design team. A summary of the workshop minutes can be found in Appendix A. The workshop was used to introduce the circular economy principles, targets and ensure that they have been implemented into the design of the development.

This written statement has been produced, alongside the CE template spreadsheet.

Note that the team has been made aware that a post-construction circular economy statement will be required, upon commencement of RIBA Stage 6, and prior to the building being handed over.

3.5 Targets

In line with the requirements outlined within the GLA Circular Economy Statement Guidance (March 2022), the Thames Young Mariners development will adhere to the following targets:

Circular Economy Targets	Applicant Commitment
Demolition Waste Materials (non-hazardous)	95% diverted from landfill (for reuse, recycling or recovery).
Excavation Waste Materials	95% diverted from landfill for beneficial reuse.
Construction Waste Materials	95% diverted from landfill (for reuse, recycling or recovery).
Municipal Waste	65% recycling rate by 2030.
Recycled Content	20% of the building material elements to be compromised of recycled or reused content.

These commitments will be monitored throughout the project, and compliancy confirmed within the post-construction CE statement. In addition to the above, the development has chosen to mandate additional targets:

- Achieve a BREEAM 'Excellent' Rating – Under the New Construction 2018 scheme.
- Achieve Operational Net Zero – In accordance with the LETI Climate Emergency Guide.

4. Methodology

4.1 Approach

In order to implement Circular Economy principles effectively, it is important to set a number of strategic objectives as early as possible. For example, by requiring a pre-demolition audit to identify materials that are suitable for reuse.

As this development has existing buildings on site, the project team have identified how their approach supports the implementation of the six CE principles. The 6 principles are:

1. Building in layers
2. Designing out waste
3. Designing for longevity
4. Designing for adaptability or flexibility
5. Designing for disassembly
6. Using systems, elements or materials that can be reused or recycled

These principles support the application of the waste hierarchy in that avoiding or reducing waste is prioritised.

5. Strategic Approach

In defining the strategic approached for the existing structures/buildings and new developments, the decision trees within the GLA guidance document were consulted with the project team.

Strategic Approach for Existing Buildings – For this development, the existing buildings on the site are not suitable to reuse or refurbish, due to their age and poor condition. Further information on this can be found under the 'Pre-Redevelopment' section of this report. Using the decision tree provided in the GLA Circular Economy Guidance document, two strategies were identified. For the new Main Building, the 'partial retention and refurbishment' option was deemed appropriate as the project team have identified the potential to re-use the existing sub-structure, with this being extended to suit the new main building, thus supporting the principles of the circular economy. For the remaining buildings on the site, the 'demolish and recycle' design approach was selected for the buildings. A big motivator as to why the buildings are not suitable for refurbishment are their poor performance in terms of energy efficiency and also the poor ground conditions, meaning their remaining life is limited. The decision on whether these materials are used on site, or on another site, is ongoing, but it is thought there are opportunities for both scenarios, and due to the size of the site, it is expected that a compactor could be located on the site. Once the main contractor is appointed, they will be required to identify local sites which may require the materials. The principles in the waste hierarchy will be followed.

Strategic Approach for Proposed Development – For this project, it will be a long-life development, with a lifespan of over 10 years. It is being designed as a 60-year site. As an outdoor activity centre, the development is unlikely to change use/function within its design life. It should be noted that, for as long as the site is owned by Surrey County Council/SOLD, it will continue to operate as an outdoor educational centre. The design approach will therefore be led by the longevity principle, designing to avoid a premature end of life for all components through considering maintenance and durability. Although change of use is unlikely, the project team have identified areas spaces which could be adapted for change of use, including flexibility to house larger conferences/learning events in the main building, with a movable wall. The residential buildings could be re-configured to suit different uses, including adapting to family rooms. To minimise waste during construction, in line with the BREEAM 'Excellent' rating being targeted, a Resource Management Plan will be produced, and a target of <7.5m^3 of waste generated per 100m^2. The proposed development utilises off-site prefabricated methods of construction, looking to minimise waste during construction, maximise efficiency, and aide easy disassembly at end-of-life.

For construction waste, the following information will be included in the prelims and sent to the bidding contractors:

1. Waste: Includes rubbish debris, spoil, containers and packaging, and surplus material requiring disposal.
2. Requirement: Minimise production and prevent accumulation of waste. Keep the site and works clean and tidy. Clean out voids and cavities in the construction before closing.

3. Disposal: Collect and store in suitable containers. Remove from site and dispose of in a safe and competent manner, as approved and directed by the waste regulation authority.
4. Recyclable material: Sort and dispose of at a materials recycling facility approved by the waste regulation authority.

In addition to the above, a social value charter will be used, which supports the circular economy principles. The below table outlines the four themes that the charter explores.

Table 1 - Social Value Charter

Theme	Objectives	Outcomes
Economy: Develop a strong and competitive local economy	Develop local supply chains and increase spend with local suppliers. Address skills shortages by creating local employment and skills development opportunities. Encourage local recruitment to support growth and sustainability.	Thriving local economy. People have the skills for work and businesses have access to a local skilled workforce. More local people in work.
Social: Support the health, wellbeing and independence of local residents	Collaborate with local voluntary and community groups to help build capacity and support sustainability. Create employment, work experience, apprenticeship, training, mentoring and befriending opportunities for priority groups. Identify and support the delivery of benefits that meet the needs of residents and make a positive impact in local communities.	Empowered, effective and resilient voluntary and community groups. People are healthier and are supported to live independently. Businesses are socially responsible and engaged with local communities.
Environment: Protect and preserve the local environment and natural resources in the county	Encourage the use of environmentally friendly products/services and ethical sourcing processes. Promote environmental stewardship to reduce carbon footprint and emissions to air, land and water. Raise awareness of local environmental and sustainability requirements.	Businesses operate sustainably and accept responsibility for their environmental impact on local communities. People live environmentally sustainable lives. People visit, work and live in our vibrant and creative town centres.

Innovation	Engage local organisations and suppliers to identify innovative solutions and preventative measures to reduce demand on services and improve resident experience.	Supplier led initiatives delivering social value locally which are high value to residents and relatively low cost to businesses.

Strategic Approach for Municipal Waste during Operation – The development will be providing refuse and waste storage in line with the local planning requirements. The proposed waste volumes are expected to stay in line with the current development, with the waste and recycling procedures continuing to operate as it does now, which are currently twice a week, collecting recycling on one day, and general waste on the other day. The main driver will be waste minimisation on the site, and the efficient use of resources. The approach to waste management is dictated by Richmond Borough Council. SOLD have committed to collecting food waste on site, with the potential to explore on-site composting facilities.

Table 2 - Strategic Approach Summary

Strategy	Building / Area	Design Approach	Target	Supporting Information
Existing Development	Main Building	Partial Retention & Refurbishment – Identified the potential to re-use the existing sub-structure.	95% diversion from landfill at end of life	Information provided in Circular Economy Workshop (Appendix A). Pre-demolition audit confirms approach and potential to reuse materials. Appendix B. Contractors will be asked to consider using demolition waste in other local projects.
	Residential Buildings	Demolish and Recycle – These buildings are in poor condition and are unable to be refurbished as they will not meet energy targets or client aspirations.		
Proposed Development	Whole Development	The following will be adhered to, as the building is not a short-term development and is unlikely to change use/function within its design life: • Designing for Disassembly	95% diversion from landfill at end of life Construction waste to be monitored	Information provided in Circular Economy Workshop (Appendix A). Whole life carbon study supports the approaches. BREEAM target of 'Excellent'

		• Designing for Adaptability • Material Re-Use On-Site • Maximising recycling		will guide principles for material selection and waste. Contractor KPI's support using local contractors and sustainability requirements within their specification.
Municipal Waste during Operation	Whole Development	Minimise waste and maximise recycling rates. Food waste – Collections to occur, along with potential to look into composting areas. Collections and separation dictated by Council.	65% recycling rate by 2030	Will be evidenced within the site waste management plan. In line with BREEAM, a target of <7.5m^3 of waste generated per 100m^2 will be targeted.

6. Core Design Principles

A core element of a CE statement is the approach to building in layers, where each layer has its own life cycle, life span, and relevant CE design approaches, and solutions. The different layers should be independent, accessible and removable whilst maintaining their value.

6.1 Building in Layers

When designing buildings, it is useful to categorise it into layers. Each layer has its own life cycle and therefore will require different design solutions to maximise the circularity. This is outlined in the figure below.

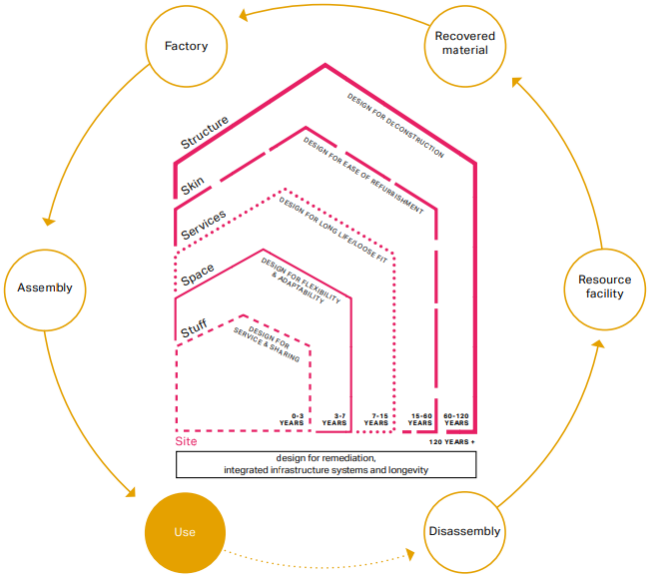


Figure 4 - Designing in layers. Source: Useful projects

The structure of a building will typically be designed to last for 100 years or more whilst features like the façade may be replaced two or three times over the life of a building. Bathrooms, kitchens, flooring, furniture and furnishings will typically be replaced much more often.

The project's design team have been engaged with regards to designing in layers. The project recognises that distinctions are necessary between the layers of the proposed building and development, so the specification of layers can consider the most probable economic life.

6.2 Approach per Building Layer

Meetings have been held with the relevant disciplines to understand how each layer will be considered in the project. This is detailed in the accompanying excel sheet in more detail. Refer to Table 3 for a summary of the strategies.

Table 3 - Approach per Building Layer Summary

Layer	Summary and Constituent Elements	Strategies
Site	The geographic setting, urban location and external works	**Retain and Reuse** – Utilising existing site.
Substructure	Excavations, foundations, basements and group floors	**Designing out Waste** – Minimising new materials through utilising existing foundations, as shown in the pre-demolition audit, and whole life carbon assessment. **Retain and Reuse** – Partial reuse for main building substructure. **Longevity** – Durable and resilient, to improve ground conditions to ensure longevity.
Superstructure	Load-bearing elements above the plinth including roof supporting structure	**Longevity** – Durable and resilient. Structurally sound to enable solar PV and future technologies to be installed.
Shell/Skin	The layer keeping out water, wind, heat, cold, direct sunlight and noise	**Designing out Waste** – Prefabricated construction method, to promote waste minimisation and simple disassembly. **Longevity** – Durable and resilient construction materials. High levels of insulation. **Adaptability/Flexibility** – Allowance for reconfiguration. **Disassembly** – Designed for easy disassembly at end of life through a prefabricated method.
Services	Installations to ensure comfort, practicality, accessibility and safety	**Longevity** – Specified to enable efficient running of the site. Designed for net zero operation. **Adaptability/Flexibility** – Building services located in accessible locations for removal and replacement.
Space	The layout of internal walls, ceilings, floors,	**Longevity** – Durable finishes to be specified, given

	finishes, doors, fitted furniture	high level of wear-and-tear from building users. **Adaptability/Flexibility** – Design team have reviewed opportunities to reconfigure spaces, to allow for a degree of flexibility with the building design, to suit building users.
Stuff	Anything that could fall if the building was turned upside down	**Designing out Waste** – Product sourcing strategy to focus on existing assets within the Surrey/SOLD estate. **Reused and Recycled** – Surrey/SOLD to review assets, and reuse fittings where possible. Emphasis on recycled furniture. **Longevity** – Durable fittings to be chosen, to allow for high usage from building users. **Adaptability/Flexibility** – Furniture will be movable where appropriate.
Construction Stuff	Any temporary installations/works/materials packaging and equipment	**Designing out Waste** – Opportunities to be explored for reusing hoardings and scaffoldings. Discussions with suppliers for feasibility of take back schemes for packaging to be explored.

In addition to the above, the development will focus on the following for material sourcing:

- Specifications will define a requirement for materials to be responsible sources, ideally from UK manufacturers.
- The contractor shall obtain Environmental Product Declarations (EPD's) for products from each manufacturer.
- Compliance with responsible sourcing standards (e.g., FSC certified timber) will be an underlying requirement.

7. Pre-Redevelopment and Pre-Demolition Audits

7.1 Pre-Redevelopment Audit

A pre-redevelopment audit is a tool for understanding whether existing buildings, structures and materials can be retained, refurbished, or incorporated into the new development.

Vail Williams conducted a Green Belt Statement. An extract from the report is shown below, showing that the existing buildings were considered for refurbishment, but were not deemed suitable.

This report has clearly set out the background of the site and SOLD who currently operate the site including their current challenges around with the site's operation which is becoming no longer fit for purpose. Consideration has been given to whether the existing buildings can be refurbished but concluded that the most suitable option is for full redevelopment of the site. No alternative sites have been identified which would be suitable to accommodate the development outside of MOL or Green Belt land and therefore the current TYM is the only site for the proposed development. There has been extensive scrutiny of the design to justify the size and scale of the development to demonstrate that all development being proposed is necessary and does not lead to unnecessary development on MOL.

Figure 5 - Vail Williams statement

A feasibility study was undertaken in 2020 by Hamson Barron Smith. This identified that the existing infrastructure at the site was outdated (original construction from the 1950s) and suffering from lack of investment. A condition list of the buildings was provided as below:

- Club House – Poor
- Boat Store – Poor
- Cedar Bungalow – Poor
- Bungalow 2 – Poor
- Classroom (pre-fab) – Poor
- Warden's Accommodation – Average
- Staff Dormitory – Average
- Changing Blocks – Average

Given the above context, it was decided that a complete replacement of the buildings needed to be carried-out. Due to the age and condition of existing buildings, the ability to bring them up to energy efficiency standards were not considered possible. There would have been significant extensions required to the existing buildings to meet the accommodation and catering needs, which would be compromised by retention of parts of the existing complex, leading to an increased density of built form within the open setting.

A new-build solution would allow the organisation and placement of building to respond to the lake and views, with a sense of arrival created, that is missing at the existing site. The new buildings are shown spaced apart to open views through the site. Modern methods of construction will allow for off-site manufacture, greater levels of efficiency to minimise energy consumption, and integrate renewable technology. It would also be noted that inclusivity and accessibility would be easier to provide through a consistent approach, with the new facilities reducing the distance that school children need to travel to access toilet and shower facilities.

7.2 Pre-Demolition Audit

A pre-demolition audit is an inventory of the materials in the building that will need to be managed upon demolition.

The audit was carried out by Evolution Enabling, with a report produced on 26/07/2023. This report is compliant with the guidance outlined within the London Plan. Figure 6 is a screenshot from the report, which shows the expected materials from the proposed demolition works. The remainder of the report investigates likely quantities of each waste stream that can be reused, recycled or recovered.

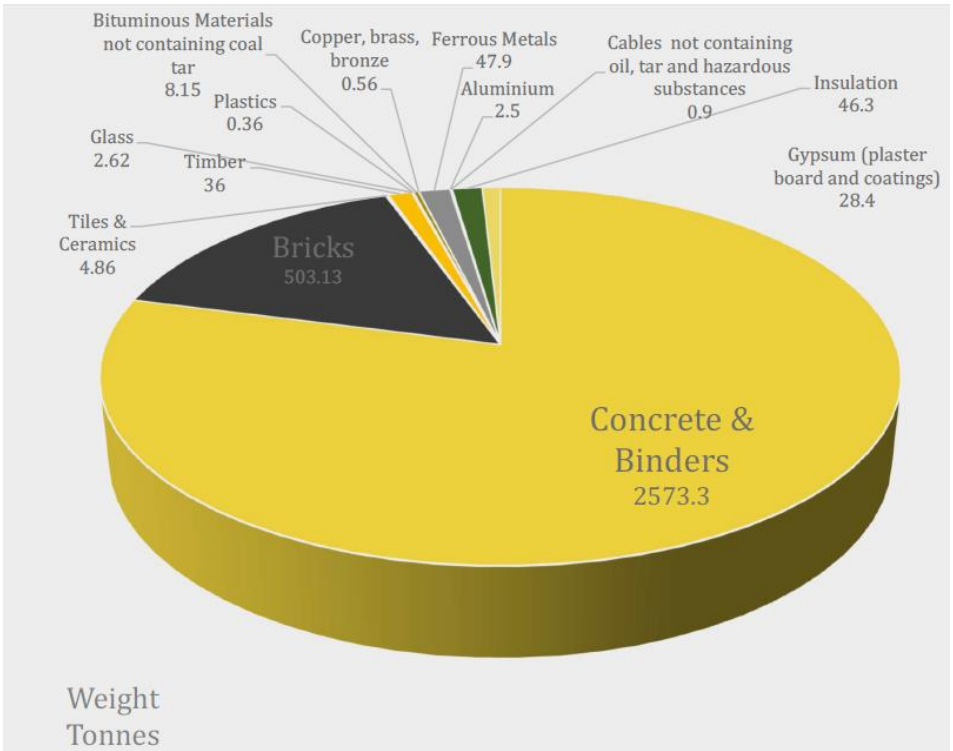


Figure 6 Demolition Material Types

8. Bill of Materials

As part of the GLA guidance, the applicant should demonstrate that they have considered opportunities to conserve resources by applying lean design principles, and to source materials sustainably. Detailed Circular Economy Statements must include a completed Bill of Materials, found within the accompanying excel document provided by the GLA for completion.

The design team are aware of the mandatory GLA target set for this area, which is that materials have a minimum 20% recycled content and are easily re-used or recyclable at the end-of-life stage to minimise the amount of virgin materials used.

The information in the excel sheet has been compiled by the design team, involving architects, building services and structural engineers. Note that the reported data is based on best estimates at the design stage and will be reviewed at the post-construction stage to confirm compliance with the targets set. Note that this is aligned to the information provided within the Whole Life Carbon statement and excel document for this development.

9. End of Life Strategy

It is crucial to consider the end of the life of the scheme from the project outset, to ensure it is simple to deconstruct, and to maximise opportunities to reuse and recycle building elements, where feasible.

The proposed development utilises prefabricated methods of construction, aiding to the simple disassembly of the buildings once they have reach end-of-life, noting that the building is being designed to a 60-year period.

When dissembling the building, the key structural materials are expected to be recyclable, or reusable, or can be reused as crushed aggregate for future developments. Guidance on disassembly and disposal of key materials will be provided in the O&Ms.

At the post-construction stage, the contractor will confirm that this information has been made available within the O&Ms, and this will be evidenced for submitting to the GLA.

10. Operational Waste Management

Operational waste shall be managed to demonstrate that the development complies with the relevant targets outlined in the London Plan Policy SI 7. The focus of these policies are to provide adequate, flexible and easily accessible storage space and collection systems. The site shall also comply with the target of 65% municipal waste being recycled by 2030. Note that the developments waste policies are dictated by Richmond Borough Council's processes, which incorporates the 2015 West London Waste Plan framework.

An operational waste management plan will be developed as the project progresses, to comply with the requirement under the BREEAM 'Excellent' requirements. Consideration to the operational waste strategy has already been given by the project team. It is intended that the volume of waste, and number of collections, will remain largely unchanged by the proposed development, compared to current functionality. Collections are currently twice a week, once for recycling, and once for main rubbish.

The refuse locations are proposed to be stationed at the north of the site, close to the staff parking. This enables the refuse vehicles to park immediately next to the bins for removal. The proposed locations are shown in figure 6.

Figure 7 - Refuse Locations

The waste management plan will comply with the following criteria, which SOLD have stated within their Environmental Sustainability Policy, outlined below.

Waste generation, management and disposal:

- Provide a suitable infrastructure for waste / waste removal around SOLD and look at ways to further reduce landfill.

- Raising awareness and education of staff and visitors to SOLD to reduce waste, recycle and reuse.
- Implement strategies to get groups involved.
- Buying conscientiously – only what we need to reduce waste, buying products that are friendly to the environment.

Food Waste Plan:

- Reduce our food waste by educating our groups visiting through fun, educational activities and resources.
- Develop composting areas around sites to reduce waste and use biproduct around our sites in our horticultural projects with groups and on site.
- Communicate with groups prior to visit around needs/menu suitability and portion size requirements to minimise waste.

11. Next Steps

The project team are aware of the requirement to submit an additional report and excel document at the post-construction stage to confirm compliance with the targets and approach outlined within this document.

12. Conclusion

This report has outlined the Circular Economy approach for the proposed Thames Young Mariners development in order to meet the requirements of the GLA London Plan Policy SI7. The guidance in the 'Circular Economy Statements guidance document' has been followed to ensure compliance.

Following a workshop with the design team and client in May 2023, a strategic approach to the existing and proposed buildings has been outlined. Throughout the report, key commitments and targets have been identified to ensure the project will contribute towards a circular economy. The 6 core principles have been addressed, which are:

- Building in layers
- Designing out waste
- Designing for longevity
- Designing for adaptability or flexibility
- Designing for disassembly
- Using systems, elements or materials that can be reused and recycled

This report is to be read in conjunction with the appendices, and GLA circular economy excel document.

Appendices

Appendix A – Circular Economy Workshop Minutes

PICK EVERARD

Minutes

Thames Young Mariners
Surrey County Council

Purpose:	**London Plan – Circular Economy and Whole Life Carbon**
Date and time:	Wednesday 17th May 2023 @ 10-11am
Venue:	Microsoft Teams
Prepared by:	Hayley Marks

Present:

Hayley Marks	Pick Everard	HM
Tom Roxburgh	Pick Everard	TR
Chris Gilbert	Pick Everard	CG
Tim Hammersley	Surrey County Council	TH
Martin Cusselle	SOLD	MC
Louise Edwards	SOLD	LE
Chunhui Hua	Atkins	CH

Distribution:
All those present

	Item	Action
1.0	**Introductions**	
1.1	Introduction to meeting attendees.	
2.0	**Introduction to the GLA Circular Economy**	
2.1	Presentation outlining principles of the circular economy, using definition from the GLA Circular Economy Statement Guidance (March 2022).	
3.0	**Strategic Approaches**	
3.1	Approaches to existing structures/buildings – Ran through the GLA decision-tree. 2 approaches: 1. Partial Retention/Refurbishment – The sub-structure is being retained and extended to form the base of the new main building. Frontage onto the water is being retained. 2. Demolish and Recycle – Remaining buildings on the site are old, energy inefficient and unsuitable for refurbishment. Noting ground conditions are also poor. Asbestos present. Concrete could be crushed on site, and used as aggregates around the site, and off-site. Contractor may have local sites in the vicinity who can benefit from this. To be explored at next stage.	
3.2	Approaches to new buildings – Ran through the GLA decision-tree: 1. Long-life span (60 years), with no intended change of use/function. Will remain as outdoor learning centre as long as Surrey CC/SOLD have control of the site. 2. Main focus on flexibility, durability and sustainability – BREEAM 'Excellent' ratings and net zero in operation carbon targets.	

4.0 Building in Layers

4.1 Layers introduced to the project team, to identify approach for each.

4.2 To be added to the excel spreadsheet and word statement in detail. **HM**

4.3 Summary:

- Flexibility has been considered for the buildings – Movable walls, reconfigurations possible.
- Furniture will be used from other Surrey CC/SOLD owned projects, formal process in place.
- Building Services – Processes outlined to confirm strategy for maintenance and removal at end of life.
- Durability – Buildings will undergo wear-and-tear given the user profile. Suitable finishes will be specified to account for this.

5.0 Design Principles

5.1 Design principles were outlined to the project team, to identify approach for each.

5.2 Designing Out Waste:

- Pre-fabricated, off-site construction – Minimises waste in design, construction and end of life for disassembly.
- Structural insulated panels to be inserted into timber panels – Rockwool insulation.
- Sourcing of materials – BREEAM compliant, local contractors. Surrey CC have KPI's. To be sent through. **TH**

5.3 Designing for Longevity:

- Durable finishes.
- Solar control on the glass, to prevent overheating.
- Renewables/low carbon heating – Solar PV's and Air Source Heat Pumps.

5.4 Designing for Adaptability or Flexibility:

- Main Building – Dividing wall could be adapted, to alter the space for events such as conferences/learning facilities.
- Residential Buildings – Built for purpose suiting the development, which is unlikely to change. Could be adapted to become adult and family rooms, or office spaces.

5.5 Designing for Disassembly/End of Life:

- Pre-fabrication will ensure easy deconstruction.
- Waste minimised for disassembly.
- M&E to confirm equipment and plan maintenance and replacement cycles, once at the next stage.

5.6 Using Systems, elements or materials that can be re-used or recycled:

- Timber cladding – Recycled at end of life.
- Building Services – Could be reused and incorporated into other plan, if of a suitable quality.
- Insulation – Rockwool insulation could be reused.

6.0 GLA Mandatory Targets

6.1 Shared with the project team, comments noted below:

- Demolition Waste – Pre-demolition audit is required. Scope to be sent for the requirements. **ALL HSM (send scope)**
- Excavation Waste – Volumes not available at this stage. Not likely to

be significant, sub-structure and bases for car park and roads only.

- Construction Waste Materials – Compliant with BREEAM 'Excellent'. Contractor to produce Resource Management Plan.
- Municipal Waste – Dictated by Richmond Borough Council, compliant with their requirements. Food waste strategy to be sent. **LE/MC**
- Recycled Content – To be confirmed in the Bill of Materials. CG to confirm whether the insulated panels have recycled wood chip content. **TR/CG**

6.2

7.0 Next Steps

7.1 Agreed the following:

- Pre-demolition audit – Require this to be conducted. Scope to be sent through. **ALL**
- Operational Waste Strategy – Require draft to be produced. Scope to be produced. **LE/MC**
- Bill of Materials – To be completed, in conjunction with WLC. **TR/CG**
- Whole Life Carbon Assessment – Underway, requires input from architecture, structural engineers and building services. **TR**

Appendix B – Pre-Demolition Audit

Thames Young Mariners Centre

Pre-demolition Audit

TYM-EVO-ZZ-XX-RP-W-260723-S2-P01

26th July 2023

EVOLUTION ENABLING
Part of the EVOLUTION GROUP
22 SIRDAR ROAD | RAYLEIGH| ESSEX | SS6 7XF
evolution-enabling.com

EVOLUTION
GROUP

This report is provided for information only and may only be distributed in its entirety, without amendment. Evolution's liability on respect of this report and reliance thereupon shall be as per the terms and conditions of contract with the client. Statements made in the report in respect of a buildings condition should not be relied upon and are provided purely in the context of providing an assessment of a building likely suitability for reuse. The opinion of a Chartered Engineer or Building Surveyor should be sought as part of the decision-making process.

EVOLUTION GROUP

Evolution Demolition Services Limited, is a Limited Company, registered in England, registered number 11229841, registered office address 22 Sirdar Road, Brook Road Industrial Estate, Rayleigh, England, SS6 7XF

Contact Information

Michael Rutter MEng
Operations Manager

Tel +44(0)7590 670763
michaelrutter@evolution-enabling.com

Sam Tape MSc MIDE
Director

Tel +44(0)7771 622799
samtape@evolution-enabling.com

Company Information

Evolution Group
22 SIRDAR ROAD | BROOK ROAD INDUSTRIAL ESTATE | RAYLEIGH | SS6 7XF
Tel +44(0)1268 774 020
evolution-enabling.com

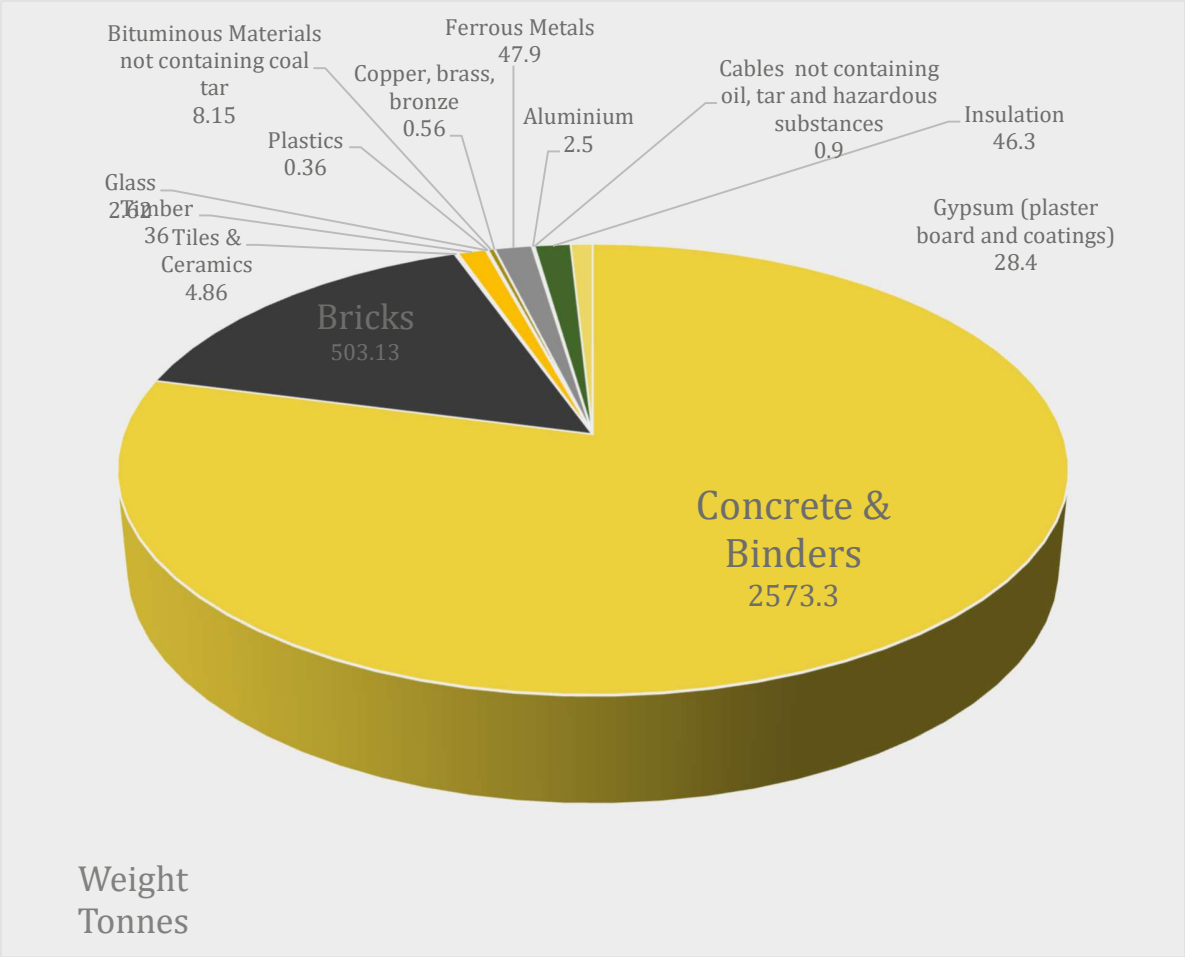
Version Control

Issue	Revision No.	Date Issued	Description of Revision: Page No.	Description of Revision: Comment	Reviewed by:
First	0	27/07/23	NA	NA	MR

Executive Summary

The Pre-demolition audit undertaken for the Thames Young Mariners Centre has estimated that there will be a total of **3,255 tonnes** of strip out and demolition arisings to process from the demolition of the buildings on site and their foundations.

The pie chart below shows a summary of the demolition materials represented as a percentage of the total weight.



Based on the assessment of the likely materials to be found on site it is recommended that a minimum target of 95% of waste is to be diverted from landfill. This target should be readily achievable through the use of traditional demolition methods and the diversion of waste from landfill through recycling and recovery.

If opportunities for the reuse of materials are to be realised a more sympathetic approach as well to the deconstruction of the building should be considered. Before undertaking this it is recommended that reclamation companies are contacted to confirm what, if any, of the available materials are suitable for reuse and to confirm the acceptance criteria for their reuse.

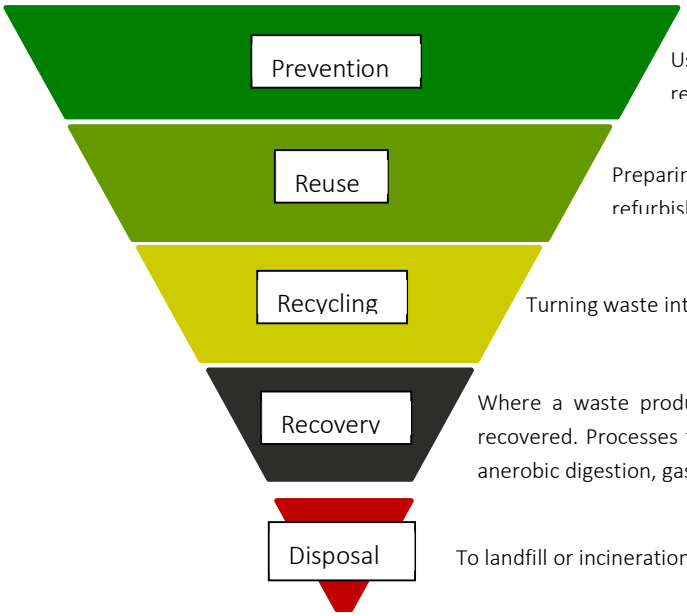
Introduction

On the instruction of Surrey County Council Evolution Enabling Services have undertaken a Pre-Demolition audit of the existing buildings situated at the Thames Young Mariners Centre, Riverside Drive, Richmond, TW10 7RX

A Pre-demolition audit, also known as a pre-refurbishment audit, it intended to be undertaken at concept design stage to confirm whether an existing building or structure is suitable for reuse and refurbishment as an alternative to demolition so as to keep the embodied energy within the retained structure and minimise the energy and carbon demand of the new construction works. In most instances refurbishment is only suitable for historical buildings where the inherent value of the building allows for the viability of the development to be maintained despite the cost of bringing the existing building up to current regulations. And multistorey steel and reinforced concrete structures where significant value can be derived from the reuse of the structural frame whilst leaving scope for the removal and replacement of the envelope and MEPH installation, to allow these elements to be bought up to modern day standards. Where it is determined that the reuse of a building will not be economically or practically viable then the pre-demolition audit is intended to ascertain the quantum of the various materials that are likely to be derived from the demolition of the building and to provide guidance on how best to utilise them in order to divert them from landfill.

Waste Hierarchy

The Waste Hierarchy defines the preference with which waste should be managed if waste generation does occur. The Waste (England and Wales) Regulation 2011 lists these in descending order of environmental preference as:



Using less material and selecting materials that can be reused, recycled, or recovered at the end of a building's useful life

Preparing construction waste for reuse by cleaning, repairing and refurbishing whole items, spart parts or useful building materials

Turning waste into a new, useful substance that can be reused on or offsite.

Where a waste product cannot be used in its existing form embodied energy is recovered. Processes to achieve this can include incineration (with energy recovery, anerobic digestion, gasification, and pyrolysis.

To landfill or incineration without energy recovery.

The principals of the Circular Economy, which should underpin the design development of new buildings, state that waste should be minimised by designing buildings in such a way that their constituent elements can be reused, recycled, or recovered at the end of the usable life of the building. In the context of the waste hierarchy this is known as Prevention and is intended to reduce the requirement for new raw materials and minimise the amount of waste leaving the circular economy.

For existing buildings reaching the end of their usable life now the opportunity for designing in the ability to prevent unnecessary waste and consumption has been lost so opportunities to reduce waste need to be found in the next levels of the waste hierarchy.

The next preference is to reuse materials in their existing state and form by repairing, refurbishing or adapting them. The reuse of a structural frame would be an example of this or the reclamation of elements such as brick or tiles to be reused in their current form in a new building. Where reuse is not possible for cost viability, practical reasons or lack of demand for reclaimed materials then the next priority is to recycle the materials.

In many cases the recycling of demolition materials is significantly more accessible than reusing them and with appropriate planning and management it should be possible to recycle the majority of demolition arisings in one way or another. This can include the use of recycled aggregates on site as 6F2, this material can be useful for the construction of hard standings, temporary platforms and haul roads, and when used as part of an engineered design for sub-based and fill forming part of the permanent works. It can also be used off site as 6F5 but it should be noted that restrictions and requirements are applied when seeking to transfer waste materials to new locations and it will be necessary to utilise licensed waste carriers and transfer stations prior to use recycled material on another site.

If recycling is not an option, then opportunities to recover the embodied energy should be explored, this can include the incineration or digestion of organic demolition waste where energy recovery is part of the process or the conversion of timber materials into pellets for use in biomass boilers.

Once these options have been exhausted only then should disposal to landfill be considered appropriate. Instances where disposal to landfill are most appropriate include where hazardous materials need to be disposed of in a controlled manor and encapsulated or where the incineration of the materials would be more detrimental to the environment than if they are sent to landfill.

Key Drivers for the production of a Pre-Demolition Audit

Whilst a pre-demolition audit is not a new concept, demolition contractors have been undertaking them as a matter of course for estimating and cost management purposes for years, they are now becoming a prerequisite for other reasons. The London Plan applies to all new construction in the Greater London Authority area, and it requires the principles of the circular economy to be considered in the design and documented in the form of a Circular Economy statement. Where demolition is required as part of the development works a pre-demolition audit will be required to contribute to and inform the circular economy statement. A pre-demolition audit is also likely to be beneficial to a development seeking to achieve BREEAM certification as, whilst it is not a minimum standard to produce one, it is a cost effective means to achieving credit in Was-01 and is a prerequisite of further credits in Was-02.

London Plan

The following report is prepared for compliance with construction best practice and in response to the Policy Requirements of the London Plan 2021, *Policy SI 7 Reducing waste and supporting the circular economy*. The report is intended to contribute to the Circular Economy Statement and will demonstrate how the Demolition works should be managed to ensure that at least 95% of Demolition Products are; Reused, Recovered or Recycled *[Policy SI 7.A5)b) & Policy SI 7.B1)].*

It will:

- Identify opportunities for managing as many of these Demolition Products on site rather than disposing of them as waste, [Policy SI 7.B3)]
- Provide an estimate of the quantity of waste that the demolition works are expected to generate [Policy SI 7.B5)]
- Set quantified targets for their reuse, recovery, and recycling.
- Provide guidance on how performance should be monitored and reported [Policy SI 7.B6)].

It will also:

- Demonstrate compliance with Policy SI 10.A1 by identifying how site won demolition materials can be utilised on site.

BREEAM

In addition to the obligations placed on projects in the Greater London Authority area through the London Plan 2021 projects that are seeking to achieve BREEAM Certification should also consider the principles of a circular economy and credits are awarded for performance against several Waste related targets. This report is compiled to comply with the relevant requirements of the Waste section of the BREEAM 2018 assessment which seeks to encourage the reduction of waste during the construction phase and through operational use and also at the end of a building's life.

During the Demolition and Construction phases, 5 credits, plus one exemplary credit, are available from the Wst 01 section, and one credit plus one exemplary credit, are available from the Wst 02 section of the assessment.

It should be noted that whilst the credits available in Wst 01 and Wst 02 are not required as a minimum standard, (unless BREEAM Outstanding is required in which cast 1 credit for Wst 01 is required), several of the credits can be obtained with relatively little additional cost through the use of effective planning and waste management practices and as such represent good value when seeking to obtain the higher BREEAM levels of certification.

Wst 01 – Construction Waste Management			
Credits Available	5	Exemplary Credits Available	1

Aim:	To reduce construction waste by encouraging reuse, recover and best practice waste management practices to minimise the amount of waste going to landfill.

Assessment Criteria	Credits	Summary Scope
Pre-demolition Audit	1	A pre-demolition (refurbishment and reuse) audit on any existing buildings, structures or hard surfaces to determine if refurbishment or reuse of the existing structures I feasible. Where it is determined that demolition is required the pre-demolition audit will be used to maximise material recovery and reuse.
Construction Resource Efficiency	3	Prepare a Resource Management Plan (RMP) which covers non-hazardous construction, demolition and excavation waste, and maintain accurate records of waste generated. The RMP should refer to the Pre-demolition

		audit and the forecast figures should be compared to the actual waste arisings. To obtain the credits the RMP should be used to meet waste generation targets in Table 10.1 of the BREEAM technical manual, which measures waste in m^3 and tonnes per $100m^2$ of GIA.
Diversion of resources from landfill	1	To obtain credits waste must be sorted and diverted from landfill in accordance with the benchmark stipulated in Table 10.2 of the BREEAM technical manual.

NB/ This report complies with the Pre-Demolition Audit and will secure 1 BREEAM credit. It does not fulfill the requirements of a Resource Management plan which will need to be commissioned separately and is normally undertaken by the Demolition Contractor or Principal Contractor. To obtain the credits Man 03 Credits the appointed contractor will need to operate an EMS accredited to ISO14001 or be in compliance with BS8555:2016.

Wst 02 – Use of recycled and sustainably sourced aggregates.			
Credits Available	1	Exemplary Credits Available	1

Aim:	To encourage the use of more sustainably sourced aggregates, encourage reuse where appropriate, and avoid waste and pollution arising from disposal of demolition and other forms of waste.

Assessment Criteria		
	Credits	Summary Scope
Pre-requisite	NA	A pre-demolition audit must be completed for the credits available from Wst-02 to be obtained.
Project Sustainable aggregate points	1 + 1	One credit is awarded for between 3.5 – 6 Project Sustainable Aggregate Points (PSAP) and an additional exemplary credit is available for more than 6 PSAP. Information on the quantity, source and use of and use of each type of aggregate must be obtained and entered onto the BREEAM Wst 02 calculator to generate the PSAP Score.

The credits targeted at Thames Young Mariners centre will be dependent on the overall BREEAM objective which will be set by the BREEAM AP appointed to the project.

Pre-demolition Audit

The scope of this appointment is to produce a Pre-demolition audit that is compliant with the BREEAM requirements to obtain 1 Credit for Wst-01 and will be in place as a pre-requisite for Wst 02 should these credits be pursued. The pre-demolition audit should be referenced in the Resource Management Plan (RMP) and actual waste arisings compared with the forecast figures in the pre-demolition audit.

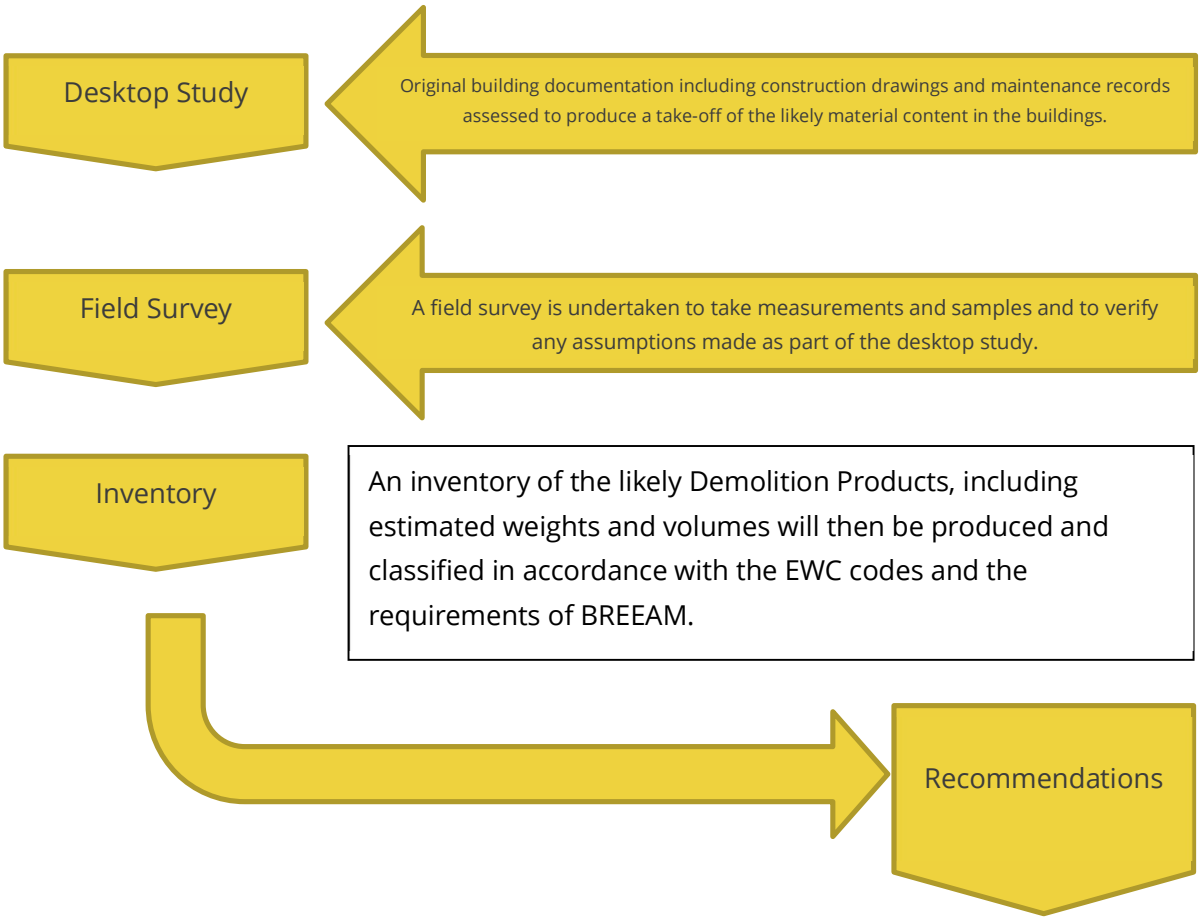
The figures in the pre-demolition audit are estimated based on the information available at the time. Where the actual waste arisings and waste management routes are significantly different from those forecasts these should be investigated to obtain the credit.

The BREEAM technical manual defines a scope for the Pre-demolition audit which also covers the requirements of the London Plan Policy SI 7 and SI 10. To comply with the BREAAM criteria and the London Plan the pre-demolition audit must cover:

1. The identification and quantification of the key demolition materials (Key Demolition Products, KDP's) which are present on the project and their classification in accordance with the European Waste Catalogue (EWC) Codes.
2. Suggest applications and any related issues for the reuse and recycling of the KDP's in accordance with the waste hierarchy.
3. Identify opportunities for the reuse and recycling of materials on site.
4. Identification of local re-processors or recyclers for recycling materials.
5. Identification of overall recycling targets where appropriate.
6. Identification or reuse targets where appropriate
7. Identification of overall landfill diversion rate for all key materials.

Methodology

In an ideal scenario and to generate the most accurate estimates possible the following process should be followed for the development of the pre-demolition audit.



- Identification of opportunities for reuse and recycling on and off-site.
- Identification of local processors and or community groups able to reuse or recycle the demolition products.
- Identification of reuse and recycling targets.
- Identification of landfill diversion targets.

Desktop Study

A desktop study was undertaken utilising the following information:

Information	Available (Yes/No)	Details
Scaled Drawings: GA's	Yes	
Scaled Drawings: Elevations	Yes	
Scaled Drawings: Sections	No	
Photographs	Yes	Satellite Imagery reviewed
Asbestos Survey	Yes	J061037 784-B024769
Structural Engineers Survey	No	
BREEAM Pre-assessment Report	Yes	DMN/JOS/211263/0.1/R001 – S2

Field Survey

Site Visit Undertaken	Yes
Date of Site Visit	14th July 2023
Visit Undertaken by:	Michael Rutter
Limitations	The survey was undertaken from ground level and was limited to a visual inspection of the buildings, no intrusive inspections were undertaken.

Overview of Existing Buildings

Based on the design of the building and materials in use the Thames Young Mariners Centre appears to have been constructed in around 1960 – 1970. Additional buildings and extensions appear to have been added over the years. The general condition of the building is fair, and it is reasonably well maintained. However, there is evidence of significant structural deterioration in certain areas and the buildings are nearing the end of their operational lifetime.

The site is used as an educational activity centre and comprises classrooms, changing facilities, offices, a kitchen and main hall, staff welfare accommodation and staff residential accommodation.

The buildings are all single storey except for a second storey above the plant room area which is inaccessible. The majority of the structures are constructed from solid masonry with 215 brickwork utilised for load bearing walls and 102 brickwork for internal walls. The roof structure to these buildings is made from a combination of flat and pitched timber overlaid with Stramit board, also known as 'strawboard', the waterproof layer is bituminous felt. It has been assumed that the ground floors of all masonry buildings is a lightly reinforced ground bearing concrete slab supported on shallow strip foundations assumed to be approximately 400mm deep by 300mm wide. There is a small section of RC structure forming an under croft to the main hall area which is showing signs of disrepair such as exposed as deteriorating rebar. It is recommended that these areas are inspected by a structural engineer or building surveyor and temporary repairs undertaken if deemed necessary. A section of the external wall adjacent to the main entrance lobby was also showing signs of structural settlement, it is recommended that this is also inspected by a structural engineer or building survey and their recommendations implemented.

There are three large timber frame structures one in use as a classroom, one as vacant accommodation and the other as a boat store. There are also several smaller outbuildings and stores.

External areas are laid to a combination of concrete hardstanding and soft landscaping.

Pre-demolition Audit Findings

The Pre-demolition audit undertaken at the Thames Mariners Centre has concluded that none of the existing structures are suitable for reuse. This is predominantly because the proposed design for the redevelopment of the site does not accord with the existing building design. However, even if it were possible to redesign the new development site to replicate the current building layout the existing buildings are not suitable for reuse. This assertion is made on the basis that.

- The existing buildings are showing signs of structural deterioration.
- Foundations are showing signs of settlement and are unlikely to be viable for reuse to current design standards.
- The building fabric will need substantial enhancement to complete with current Part L regulations and this is not expected to be economical.

As such this audit has therefore focused on the reuse, recycling, and recovery of the constituent demolition materials. It should also be noted that the Refurbishment and Demolition Survey

undertaken for compliance with the Control of Asbestos Regulations has identified some asbestos containing materials that will require removal by a licensed contractor prior to commencement of the demolition works. These materials will be removed as hazardous waste and are not included in this assessment.

The Demolition Materials likely to be obtained from the Thames Young Mariners Centre are summarised below in Table 1 and over the page on Figure 1. In Total it is estimated that 1698 m3 and 3255 tonnes of demolition materials will be obtained from site.

Table 1: Summary of KDP's likely to be obtained from the demolition of the TYMC

Material	EWC	Volume m3	Weight kg	Weight Tonnes	% Of total volume	% Of total weight
Concrete & Binders	170101	1131.3	2573262	2573.3	66.6%	79.1%
Bricks	170102	359.4	503126	503.13	21.2%	15.5%
Tiles & Ceramics	170103	1.8	4863	4.86	0.1%	0.1%
Timber	170201	50.9	36154	36	3.0%	1.1%
Glass	170202	1.0	2619	2.62	0.1%	0.1%
Plastics	170203	0.3	363	0.36	0.0%	0.01%
Bituminous Materials not containing coal tar	170302	7.4	8151	8.15	0.4%	0.3%
Copper, brass, bronze	170401	0.1	562	0.56	0.00%	0.02%
Ferrous Metals	170405	6.1	47920	47.9	0.4%	1.5%
Aluminium	170407	0.9	2536	2.5	0.06%	0.08%
Cables not containing oil, tar and hazardous substances	170411	0.4	868	0.9	0.03%	0.03%
Insulation	170604	123.0	46280	46.3	7.2%	1.4%
Gypsum (plaster board and coatings)	170802	15.4	28356	28.4	0.9%	0.9%
Total		**1698**		**3255**		

NB/ The volume of materials stated is the quantum of material in the solid. The actual volume of demolition materials will be significantly higher due to bulking.

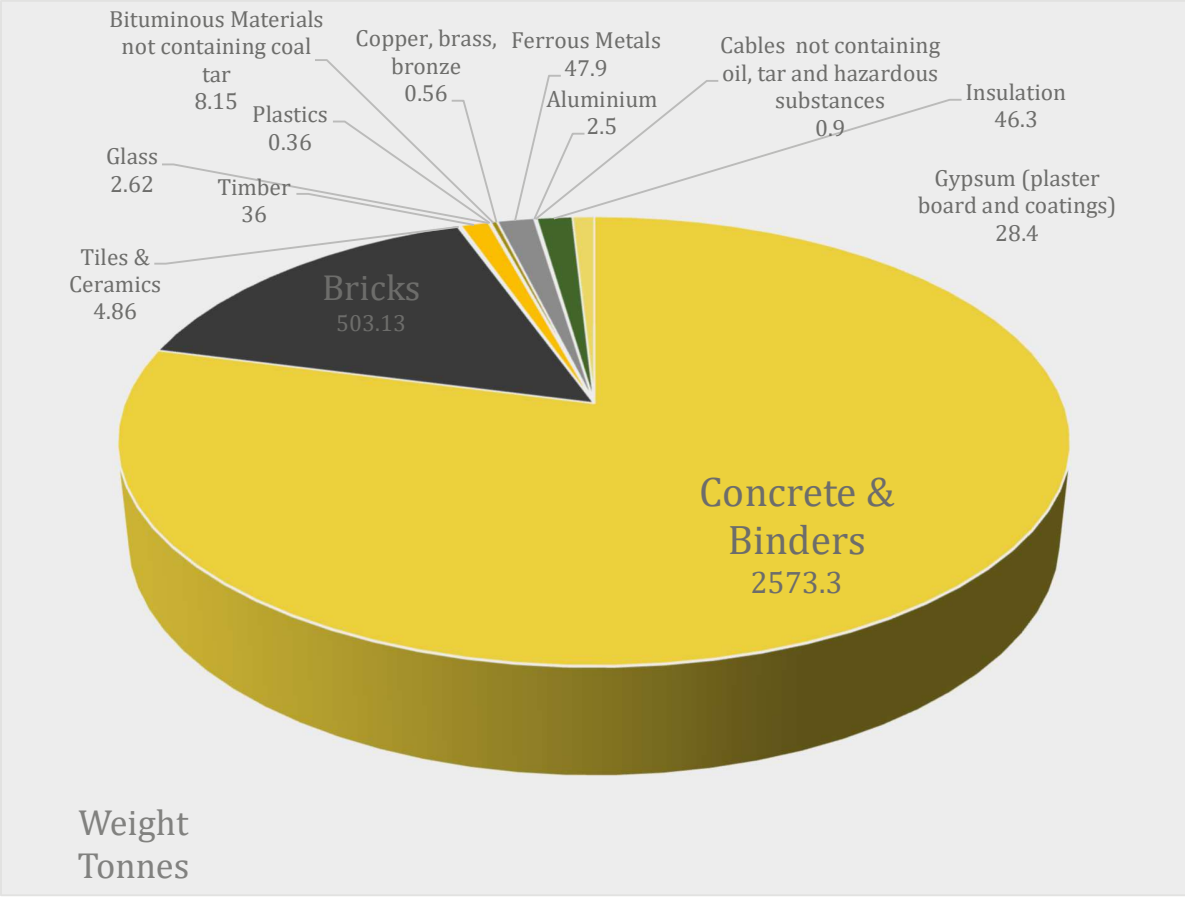


Figure 1: KDP Constituent Components

The following section of the report provides further analysis of these individual waste streams and suggests the likely quantities of each waste stream that can either be reused, recycled or recovered in order to divert them from landfill.

Suggestions are provided for local companies that may be able to process the demolition materials for recycling, reuse, or recovery.

Concrete

For the purposes of this report all cementitious materials, i.e. those containing cement, are classified as Concrete. This will include cast in situ concrete, concrete blocks, mortar and screed.

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170101	1131.3	2573.3	0%	100%	0%	0%

Sources from Building

Type of Concrete	Location in Building	Assumptions
Cast in-situ concrete	Ground Floor Slab Foundations Benching	It was assumed that all foundations are mass pour strip footings and that the ground floor is a reinforced concrete slab. There is a limited RC structure forming the undercroft area under the main hall. An element of mass pour concrete has been assumed included as bed and surround to the below ground drainage.
Concrete blocks	Load bearing blockwork	There is a small quantum of concrete blockwork in the load bearing structure.
Mortar	All brickwork and blockwork bedded on 10mm mortar.	A

Recommendations

We would recommend that as the buildings are demolished all concrete products are segregated and stockpiled on site for crushing to 6F2 once sufficient space has been made for plant and stockpiling. 6F2 is a recycled aggregate which will include other demolition materials such as brick that can be used for multiple purposes on site including, piling mats and other temporary works platforms, and structural fill under road sub-bases.

It should be noted that the crushing process is noisy and if not managed correctly it can generate significant amounts of dust. The methodology for crushing the concrete materials should be covered in the Demolition Management Plan and addressed in a Section 61

application prior to the commencement of works in order to obtain a Section 61 licence covering these works.

Excess material can be taken offsite and recycled by a specialist waste management contractor for reuse as the recycled aggregate 6F5 on another project.

Alternative unprocessed clean concrete can be disposed of via a licenced waste carrier for processing off site.

Suitable Waste Management Contractors

Powerday; https://www.powerday.co.uk/
Cappagh; https://www.cappagh.co.uk/service/recycled-aggregates
O'Donovan Waste Disposal; https://www.odonovan.co.uk/services/recycled-aggregates/
Hintons; https://www.hintonswaste.co.uk/waste-management/construction-waste-recycling/

Bricks

There is a significant quantity of low grade bricks in the external façade of the building and the boundary walls, there are also likely to be some engineering bricks in below ground applications. It has been assumed that the mortar is sand and cement throughout. Given this and the low grade bricks forming the structure it is unlikely that it will be economical to recover any significant quantity for reuse. A target of 20% for reuse has been suggested, with the remainder to be crushed on site for use as 6F2/6F5.

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170102	359	503	20%	80%	0%	0%

Sources from Building

Bricks	Location in Building	Assumptions
Face bricks	External wall of buildings	Solid 215 external walls and 102 internal walls
Engineering Bricks	Below ground applications.	

Recommendations

Given the age of the buildings it is unlikely that the bricks have significant reclamation value, but it is still recommended that a brick reclamation merchant is contacted to confirm whether they will be able to reclaim some of the bricks for reuse. The bricks have been laid using a sand and cement mortar and as such dismantling the wall without breaking the bricks will be more difficult and cleaning the bricks for reuse will also be more challenging than if a lime-based mortar had been used. As such a target reuse percentage has been set at 20% to account for the inevitable breakage that will occur during the deconstruction process.

Where it is not possible to salvage reusable bricks, the broken and damaged bricks and the mortar should be stockpiled with the concrete products for crushing and recycling on site.

As with concrete products if excess material is left on site a waste management contractor should be utilised to collect the surplus brick material for processing and use off site as a recycled aggregate.

Suitable Waste Management Contractors

London Reclaimed Brick Merchants; http://www.lrbm.com/

Powerday; https://www.powerday.co.uk/
Cappagh; https://www.cappagh.co.uk/service/recycled-aggregates
O'Donovan Waste Disposal; https://www.odonovan.co.uk/services/recycled-aggregates/
Reston Waste https://www.restonwaste.co.uk/waste-management/demolition-waste-recycling/
Hintons; https://www.hintonswaste.co.uk/waste-management/construction-waste-recycling/

Tiles and Ceramics

There is a limited quantum of ceramic tiling on site, the remaining volume of ceramic material will be on the form of sanitaryware.

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170103	1.8	4.9	15%	85%	0%	0%

Sources from Building

Tiles and Ceramics	Location in Building	Assumptions
Sanitaryware	Bathrooms and W/C	
Ceramic tiles	Bathrooms	

Recommendations

There is no opportunity to recover any of the ceramic tiling on site so this should be crush on site with the brick and concrete for use as recycled aggregate

There is unlikely to be a market for reclaimed sanitaryware of the nature on site but the options for reclamation and reuse should first be explored to confirm this a target of 15% reuse has been set to reflect the potential opportunity that is most likely to come from the basins in the changing facilities. Any material that is not reclaimed should be crushed with the recycled concrete and brick.

Suitable Waste Management Contractors

JJR Reclamation https://www.jjrreclamation.co.uk/reclaimed-roof-tiles/
Powerday; https://www.powerday.co.uk/
Cappagh; https://www.cappagh.co.uk/service/recycled-aggregates
O'Donovan Waste Disposal; https://www.odonovan.co.uk/services/recycled-aggregates/
Reston Waste https://www.restonwaste.co.uk/waste-management/demolition-waste-recycling/
Hintons; https://www.hintonswaste.co.uk/waste-management/construction-waste-recycling/

Wood

There is a substantial volume of wood which is available for reuse, recycling or recovery.

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170201	50.9	36	30%	40%	30%	0%

Sources from Building

Wood	Location in Building
Structural timbers	Roof trusses and rafters
Second fix joinery	Architraves and skirting
Doors and frames	
Cladding	
Kitchen units	

Recommendations

There is a variety of different wood products on site, and each will need to be treated differently to ensure it is managed to the optimum effect. Structural timbers in roof trusses and ceiling rafters are likely to be suitable for reuse and should be handled sympathetically to allow for this. Local community groups and reclamation services will often collect usable timber for reuse and should be contacted to see whether this will be possible in this case.

Lower grade timber that has been removed from the building should be segregated from other waste streams and collected by a suitable waste management contractor. Wood and wood products that are not suitable for reuse can either be recycled into woodchips for reprocessing into recycled wood products or processed into biomass fuel for energy recovery. Some clean wood can be deposited free of charge at green fuel power plants.

Possible Waste Management Contractors

https://communitywoodrecycling.org.uk/
Powerday; https://www.powerday.co.uk/
Tilbury Green Power Plant aet-biomass.com

Glass

The majority of glass recovered from the building will be from external windows..

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170202	1	2.6	0%	100%	0%	0%

Sources from Building

Glass	Location in Building	Assumptions
External windows	External facade	Windows assumed to be 3m : 4.7mm double glazed units.

Recommendations

The is no realistic opportunity to reuse glass but there are opportunities for different grades of recycling. A specialist glass recycling contractor should be contacted to ascertain whether the glass can be recycled into new plate glass. If not then it will be possible to recycle into lower grade glass for bottles and similar applications.

Possible Waste Management Contractors

Berrymans offer a nationwide glass collection service for all types of glass http://www.berrymanglassrecycling.com

Metals

There are a variety of recoverable metals expected to be generated from the demolition process including ferrous and non-ferrous metals, all will be recyclable and will likely have some reclamation value.

EWC Code	Type	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
1704	All	7.1	51	0%	100%	0%	0%
170401	Copper, brass	0.06	0.56	0%	100%	0%	0%
170405	Ferrous	6.1	48	0%	100%	0%	0%
170407	Aluminium	0.94	2.5	0%	100%	0%	0%
170411	Cables	0.43	0.9	0%	100%	0%	0%

Sources from Building

Metals	Location in Building	Assumptions
Reinforcement bar	Precast slabs and cast in-situ reinforced concrete	Slab assumed to be lightly reinforced. A higher quantum may be available if slabs are more heavily reinforced than expected
Pipework	Plumbing	
Sanitary fittings	Taps and valves	
Mixed	Electrical accessories and heating equipment	
Cables	Electrical installation	

Recommendations

The most significant quantity of metal will be recovered from reinforced concrete and should be extracted using demolition plant such as a multiprocessor prior to crushing the concrete. This should then be segregated in metals skip for collection and recycling.

The pluming installation will be made up of non-ferrous metals such as copper and brass and possibly lead, each type of non-ferrous metal should be segregated separately for recycling.

Cables should also be separated and recycled separately, it is not necessary to remove the sheathing and specialist recycling companies will recover the copper for recycling.

The majority of windows and doors appear to be constructed from aluminum frames which is fully recyclable.

Mixed metals will be contained in heating equipment such as boilers and radiators and in electrical accessories which will also include plastic.

Possible Waste Management Contractors

It is recommended that a local reputable scrap metal recycling contractor is contacted to arrange for the collection and recycling of different metals.

Insulation

There is very little thermal insulation on the site. However, there is a significant quantity of Stramit board, also known as straw board which has been used at the roof decking throughout the site. This material has cannot be reused as it will break up on removal and is a combination of natural straw and chemicals including formaldehyde and other setting resins. We are not aware of a recycling process that uses this material and the presence of the resins and formaldehyde mean it is unlikely that it would be accepted for recovery, although this should be checked prior of disposing of the material to landfill.

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170802	121	46	0%	0%	0%	100% (1.4% of total)

Sources from Building

Gypsum	Location in Building	Assumptions
Stramit Boards	Roff structure above timber joists	Boards assumed to be 100 mm due to load bearing requirements.

Recommendations

The material should be segregated into skips and disposed offsite to landfill. Whilst the volume of material is quite high as a proportion of the overall waste volumes (7%) the material is low density and as such only accounts for 1.4% of the overall quantity of KDP's meaning it can be disposed of to landfill without compromising the 95% overall target for diversion from landfill.

Possible Waste Management Contractors

Powerday; https://www.powerday.co.uk/

Gypsum

There is a limited amount of gypsum board on site as most of the walls are constructed in masonry and only the residential areas have a plasterboard ceiling. The majority of the gypsum material is assumed to be in plaster coatings to walls. A closer inspection may identify that the walls have a sand and cement render but this is considered unlikely.

EWC Code	Volume (m^3)	Weight (Tonnes)	Reused	Recycled	Recovered	Landfill
170802	174	167	0%	70%	0%	30% (1.5% of total)

Sources from Building

Gypsum	Location in Building	Assumptions
Plaster board	Internal partitions and ceilings	Boards assumed to be 12.mm wallboard
Plaster coatings	Plaster coatings to walls	Masonry walls have 11mm of hardwall and 2mm skim plaster to internal faces.

Recommendations

Gypsum products should not be disposed of in general landfill as the gypsum can react with biodegradable matter and produce harmful hydrogen sulfide gas. It is therefore a requirement that all gypsum materials are segregated and properly disposed of.

Plasterboard is readily recycled and can be reprocessed into the raw materials for the production of new plasterboard. As such all plasterboard should be segregated into a separate plasterboard skip and collected for recycling by a licensed contractor.

It has been assumed that the masonry walls have been finished with a hardwall and skim plaster finish that should be removed prior to processing the concrete blocks into 6F5/6F2. The plaster should then be transferred to a segregated skip for removal to a specialist landfill site designated for the disposal of gypsum products.

Possible Waste Management Contractors

British Gypsum https//www.british-gypsum.com/sustainability/our-sustainability-services/our-plasterboard-recycling-service

Country Style Recycling https://www.countrystylerecycling.co.uk/our-services/plasterboard-recycling/

Plasterboard Recycling http://www.plasterboardrecycling.co.uk/

Other Demolition Materials

In addition to the material streams discussed on the previous pages there will also be small quantities of plastics and other materials not classified above. These should be collected in a missed construction waste skip for collection, sorting and processing by a suitable waste management contractor.

Hazardous Waste

The R&D survey has identified a number of Asbestos Containing Materials (ACM's) on site which should be removed by a licensed contractor prior to the commencement of demolition. All ACM's must be handled in accordance with the recommendations of the R&D Report and according to the Control of Asbestos Regulations 2012.

Other hazardous wastes on site include fluorescent tubes and compact fluorescent lamps, these should be collected and stored, undamaged in a segregated bin for collection by a hazardous waste carrier.

Conclusions and Recommendations

The pre-demolition audit has shown that there is an estimated volume of 1698m^3 of demolition material weighing approximately 3255 tonnes. The key demolition materials are; concrete, brick, timber, tiles, metals, glass and gypsum based products. There are smaller quantities of plastics to be disposed of and a small quantum of hazardous waste that will require specialist handling.

There is the potential for substantial, reuse, recycling and recovery to ensure that the majority of materials are diverted from landfill. To maximise the opportunity for ruse, recycling and recovery, materials should be segregated into the various waste streams listed in the table above for collection and processing by the relevant waste contractor. It should be noted that the ability to reuse and recycle some of these demolition materials will be dependent on the demolition methods used. Traditional demolition methods utilising heavy plant for all operations will reduce the opportunity for reuse and recovery and as such a more sympathetic approach to deconstruction should be considered where it is desirable to maximise the opportunities at the top of the waste management hierarchy.

Recycling & Reuse Targets

Prior to the commencement of demolition, it is recommended that recycling targets are set based on the content of this report. It may be necessary to make contact with the reclamation companies prior to the appointment of a demolition contractor to ascertain the viability for reuse of some of the materials, if necessary, the reuse targets should be adjusted. The targets should be communicated to the demolition contractor to ensure that opportunities for reuse and recycling are realised.

Demolition Material	Reuse	Recycle	Recovery	Landfill
Concrete & Binders	0%	100%	0%	0%
Bricks	20%	80%	0%	0%
Tiles & Ceramics	15%	85%	0%	0%
Timber	30%	40%	30%	0%
Glass	0%	100%	100%	0%
Plastics	0%	50%	50%	0%
Bituminous Materials not containing coal tar	0%	100%	0%	0%
Copper, brass, bronze	0%	100%	0%	0%
Ferrous Metals	0%	100%	0%	0%

Aluminium	0%	100%	0%	0%
Insulation	0%	0%	0%	100%
Gypsum	0%	70%	0%	30%

It is anticipated that a minimum of 95% by weight of demolition materials can be recycled on this project.

Demolition Phase and Comparison of Actual Arisings with Forecast

The appointed demolition contract should refer to this pre-demolition audit in their Resource Management Plan and accurately record the total weights and volumes of each waste stream and the waste management method used in each case. On completion of the demolition works the forecast totals should be compared with the actual arisings and an assessment undertaken to understand the reasons for any significant divergence between them. Where barriers are identified that have impaired the opportunities for reuse and recycling these should be further investigated, and steps taken to mitigate them for future projects.

Final Destination Facilities

Material	Final Destination	Landfill, Recycled, EFW
Glass	Berryman Glass Recycling, Lidgate Crescent, Langthwaite Business Park, South Kirkby WF9 3NR	Recycled (closed loop recycling) All glass from the project will be 100% recycled by Berryman Glass Recycling. Recycling ranges from closed loop systems to make new bottles and jars, to construction products, insulation and many other useful products.
Concrete	Mick George Group, St John's Innovation Park Cowley Rd Milton, Cambridge CB4 0WZ	Recycled (open loop recycling) Concrete is crushed and sold on as aggregate in the UK. Crushed recycled concrete is graded and screened to a nominal size of 40mm and is used in a variety of jobs from under floor slabs and driveways to car parks and hardstand areas.
Metal	EMR, Industrial Estate, 3 Willow Ln, Ellis Rd, Mitcham CR4 4HX	Recycled (closed loop recycling) All metal is recycled. The process involves the scrap metal being separated into different types to then be melted down. It is then sold to various companies to be turned into new metal products. Virtually all metals can be recycled into high-quality new metals.
Timber	Sita, 1 London Gate, 252-254, Blyth Road, Hayes Middlesex, UB3 1HA	Recycled (closed & open loop recycling) / EfW Timber will be sorted into 2 x types: 1. Manufacturing wood wastes reclaimable and recyclable wood materials – from demolition and construction, which can be reused as flooring, beams etc… 2. Wood that cannot be recycled is chipped to provide EfW. Sita provide wood chips to companies across Europe
Plasterboard	Plaster Board Recycling Solutions Ltd, 1 Mill Ln,	Recycled (open loop recycling) The plasterboard will be turned into

	Wingrave, Aylesbury HP22 4PL & Plasterzone, 11 Atcost Rd, Barking IG11 0EQ	recycled gypsum powder by processing the gypsum waste in such a way that the contaminants are removed and the paper facing of the plasterboard is separated from the gypsum core through mechanical processes including grinding and sieving in specialised equipment. The resulting gypsum powder is mainly sold in the UK for drywall, but is also sold to European countries as a soil fertilizer.
Tiles & Ceramic	Mick George Group, St John's Innovation Park Cowley Rd Milton, Cambridge CB4 0WZ	Recycled (closed loop recycling) Tiles & ceramics will be recycled, and turned into secondary aggregates, in accordance with the WRAP Quality Protocol – Aggregates from Inert Waste and to ensure conformance with the waste hierarchy. The resultant suitable inert material produced during the recycling process may then be utilised in the restoration of Mick George quarry at Mitchell Hill Farm.

Evolution Enabling

22 Sirdar Road
Brook Road Industrial Estate
Rayleigh
Essex
SS6 7XF

+44 (0) 1268 774 020

EVOLUTION
GROUP

PICK EVERARD | Deliver better together.