BREEAM Pre-Demolition Audit Report

Hillingdon Hospital
London Borough of Hillingdon

The Hillingdon Hospitals NHS Foundation Trust

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Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
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Introduction

AECOM Limited (hereafter referred to as 'AECOM') has been appointed by The Hillingdon Hospitals NHS Foundation Trust (hereafter referred to as the 'Client' / 'Applicant') to prepare this Building Research Establishment Environmental Assessment Method (BREEAM) Pre-Demolition Audit Report (hereafter referred to as the 'Report'). This Report has been prepared by AECOM to accompany hybrid planning application being submitted by the Applicant to the London Borough of Hillingdon.

The proposal comprises hybrid planning application for:

1. FULL application seeking planning permission for demolition of existing buildings and redevelopment of the site to provide the new Hillingdon Hospital, multi-storey car park and mobility hub, vehicle access, highways works, associated plant, generators, substation, new internal roads, landscaping and public open space, utilities, servicing area, surface car park/ expansion space, and other works incidental to the proposed development.
2. OUTLINE planning application (all matters reserved, except for access) for the demolition of buildings and structures on the remaining site (excluding the Grade II Furze and Tudor Centre) for a mixed-use development comprising residential (Class C3) and supporting Commercial, Business and Service uses (Class E), new pedestrian and vehicular access; public realm, amenity space, car and cycling parking.

As per the BREEAM New Construction 2018 (UK)[1], a total of 5 credits can be obtained for the Wst 01 Construction Waste Management criteria.

- One Credit – Pre-Demolition Audit:
    1. Complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered for demolition. This audit will:
        a) Be carried out at Concept Design stage by a competent person prior to strip-out or demolition works
        b) Guide the design, consider materials for reuse and set targets for waste management
        c) Engage all contractors in the process of maximising high-grade reuse and recycling opportunities
    2. Refer to the audit in the Resource Management Plan (RMP)
    3. Compare actual waste arisings and waste management routes used with those forecasts and investigate significant deviations from planned targets
- Three Credits – Construction resource efficiency: preparing a compliant RMP with the aim of minimising and monitoring waste.
- One Credit –Diversion from landfill.

This Report will support the Client towards obtaining one credit (Pre-Demolition Audit) for the BREEAM Wst 01 Construction Waste Management criteria.

Site Context

The total application boundary covers an area of 9.6hectares.

Hillingdon Hospital is located to the south of Pield Heath Road, bound by Royal Lane to the west, and Colham Green Road to the east. The site is located within the Brunel Ward. The site comprises a ten storey block built in the 1960s and a mix of other hospital buildings scattered across the site. Many of the acute beds are in single storey wards built in the 1940s, which are in very poor condition.

[1] BREEAM UK New Construction Non-domestic Buildings (All UK) Technical Manual SD5078: BREEAM New Construction 2018 3.0

The remainder of the site consists mainly of surface level car parking, interspersed with pockets of landscaping. Hillingdon Hospital is located within the urban area of Hillingdon and is not subject to any designations such as Green Belt or site allocations. It is not within a conservation area.

Proposed Development

Detailed planning permission will be sought for:

- Replacement hospital building (79,603.6 sqm GIA) of basement, ground plus seven storeys on the western extent of the site incorporating a linked mobility hub and multi storey car park (MSCP) for 781 car spaces;
- High quality landscaping buffer fronting Royal Lane;
- New bus stop arrangements and improved connections to the hospital on Pield Heath Road;
- Large central green open space for use by the hospital and wider community;
- 161 surface level car parking spaces with the ability to cater for up to 14,000 sqm of expansion space for future hospital expansion (if required).

Outline planning permission will be sought for the wider masterplan comprising the following proposals:

- Up to 33,870 sqm of residential, comprising 327 dwellings;
- Plots – P01, P02, P04 (mixed use blocks with supporting provision of 800sqm of town centre uses (Use Class E) at ground floor level).
- Up to 302 car parking spaces, and 515 cycle parking spaces.
- Improved permeability and public access routes through the site;
- High quality public realm and landscaped gardens throughout the site.

Aims and Objectives

The main aim of the Report is to identify and quantify the materials that might be generated on Site during the demolition phase. This information will assist the Client to maximise the recovery of material for subsequent high grade or value applications.

The objectives of this Report are to:

- Identify the types and quantities of key materials present in the existing buildings, structures and hard surfaces;
- Identify potential applications and any related issues for the reuse and recycling of the key waste/materials in accordance with the waste hierarchy;
- Identify opportunities for reuse and recycling within the same development;
- Identify local reprocessors or recyclers for recycling of materials;
- Identify overall recycling targets where appropriate;
- Identify reuse targets where appropriate; and
- Identity overall landfill diversion rate for all key materials.

Key Waste Principals

The Waste Hierarchy

Clause 12 of The Waste (England and Wales) Regulations 2011[2] requires that anyone involved in the import, generation, collection, transferring, recovery, or disposal of waste must take all such measures available to apply the waste hierarchy.

This Report considers the waste hierarchy and encourages materials identified on-Site to be reused before they are sent for recycling, recovery, or disposal. The main principles of the waste hierarchy are summarised in Figure 1.

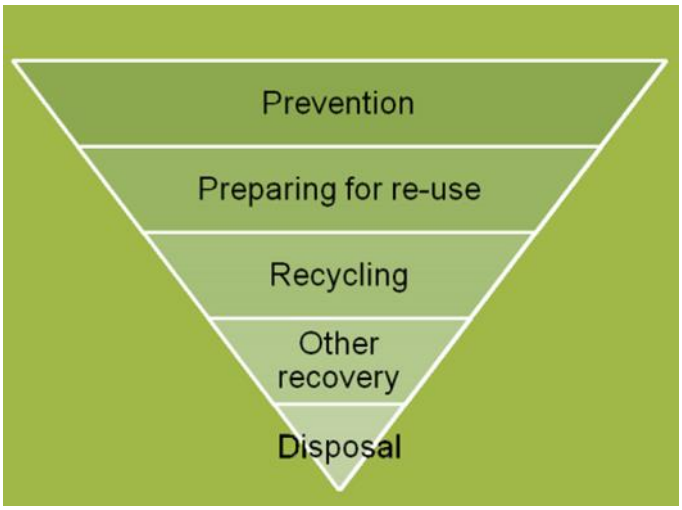

Figure 1 Waste Hierarchy[3]

The Circular Economy

A Circular Economy is a systematic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the '*take make waste*' linear model, a Circular Economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources. The Circular Economy activity focuses on design that is regenerative and restorative. This is based on three principals:

- Design out waste and pollution;
- Keep products and materials in use; and
- Regenerate natural systems[4].

This Report can help encourage a Circular Economy by:

- Influencing the wider design team to consider reclamation and reuse of waste/materials found on-Site to be incorporated in the Proposed Development, avoiding disposal of valuable materials, and
- Identifying reuse and reprocessors companies for materials found on-Site, extending the products useful life before being remanufactured.

Figure 2 demonstrates the key stages and principles used when applying the Circular Economy to the built environment.

[2] The Waste (England and Wales) Regulations 2011 (as amended)
[3] Defra Guidance on applying the Waste Hierarchy
[4] Ellan MacArthur Foundation [The Circular Economy In Detail (ellenmacarthurfoundation.org)]

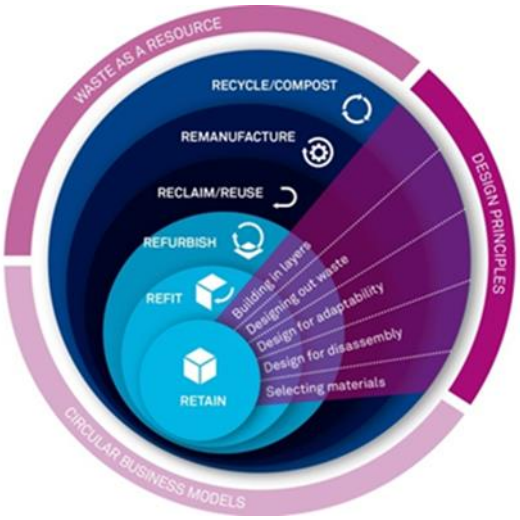

Figure 2 Applying Circular Economy Principles to Building Design[5]

[5] Building Revolutions, David Cheshire, AECOM, RIBA Publications, 2016

Methodology

In line with BREEAM requirements, the Site Audit was carried out by competent persons: '*… who has appropriate knowledge of buildings, waste and options for reuse and recycling of different waste streams*'.

Since the majority of buildings are currently in active use as part of the hospital and having regard to COVID requirements, it has not been feasible to carry out site surveys at this stage. This Site Audit has therefore been carried out as a desk-based exercise, using drawings provided by the Applicant and a review of existing visual imagery of the exterior of the buildings.

Exclusions and Assumptions

The following exclusions, assumptions and caveats apply to this Report:

- For the following buildings, the audit has been undertaken without the survey team having attended and has been based on high-level information and photos provided by Quinn London Contractors for the following facilities:
  - Link Corridor (Partial Demo)
  - Canteen (Partial Demo)
  - Adult Audiology
  - Substation
  - Alderbourne
  - Pinewood Ward
- Where clear line of sight/access was not available to attain measurements e.g. thicknesses, best judgement and assumptions have been made with reference to the DoWT-B spreadsheet.
- For the following buildings, the audit has been undertaken without the survey team having attended and based solely on provided floor plans:
  - Geriatic Day Hospital
  - Beaconsfield
  - Quebec ward
  - Osterley ward
  - Churchill ward
  - Middlesex ward
  - Lister ward
  - Pagett ward
  - Diabetic care
  - High voltage plant
  - Podium
  - Greenacres
  - Education & Training
- Best judgement and assumptions have been made with reference to the DoWT-B spreadsheet.
- For all buildings, no structural drawings were provided, only floor/layout plans. As such, the construction and materials for the buildings have been calculated based on best judgement and construction knowledge in terms of composition, thickness and methodology.
  - Carparks C1, C2 & C3 - All quantities and compositions were collated based on what could be identified using desktop methods such as Google Earth and Bing Maps.
  - 10% of concrete volume was given as steel reinforcement for the Podium.

  - Doors and windows have been included at a standard size across the estate.
  - It is assumed that all tenant installed furniture, equipment and miscellaneous non-fixed items will be removed by the tenant upon vacating the premise, and as such has not been taken into account for this assessment.
  - The areas of glazing are not excluded from the mass of walls.
  - It is assumed that all tenant installed furniture and equipment will be removed by the tenant upon vacating the premise, and as such will not be taken into account for this assessment.
  - Assumed under portakabins that a 150mm slab foundation is in place.
  - Assumed that all partitions are formed of timber studwork and not metal.
  - Floor finishes decided on based on building useage.
- Exclusions:
  - Busy Bees Nursey BB - No information was made available for Busy Bees nursery and hence no allowance have been made for this building.
  - Old Creche 53 - no allowance has been made for this building.
  - Small power, data and large/specialist plant has not been included within the calculations (including but not limited to internal wiring, copper pipes, boilers, HVAC etc).
  - No excavations have been taken into account for this audit.
  - Allowances have been made for foundations of each building, but not basements.
  - No biomass has been included in the calculations. Only inert materials have been allowed for.
  - The residential boundary fencing is not included in this audit (masonry and timber).
  - The temporary fencing is not included in this audit (timber and metal).

Key Materials Identified

The following section describes the key materials identified, their location and the estimated quantities obtained during the audit. Based on the condition of the materials and the likely availability of recovery routes, a circularity rating for the materials has been provided to determine whether they can be reused, recycled, sent for recovery or disposed to a landfill as a last resort. The circularity rating describes how likely the materials is to be reused on/off site and has been based on professional judgement.

The circularity rating is based on the following key, shown in Table 1. The ratings and related descriptions are recommendations for the management route of the materials identified; the exact routes for the materials will be determined by the appointed demolition contractor.

Table 1 Circularity Rating

Indicator	Description
	Good condition and reuse of this material is possible.
	Wear and tear – this material is likely to be recycled. Alternatively, this indicator may be used if the material is in a good condition but there is no market for reuse and therefore it has to be recycled.
	Poor condition/not reusable or non-recyclable material, this may be due to a number of reasons such as there being no end market for the material to be recycled (e.g. composite materials) or due to the small quantity of the material present, which therefore makes it unviable to recycle separately. This material is likely to be sent to landfill or energy recovery.

Concrete

Locations and Quantities

Table 2 presents the quantities of concrete in each building where it is assessed as being present.

Table 2 Concrete Location and Quantities

Building Number	Building Name	Approximate Quantity (m^3)
1	Alderbourne Unit	576
2	Geriatric Day Hospital	336
3	Beaconsfield	729.7
5	Quebec Ward	203.1
6	Pinewood Ward	203.1
7	Osterley Ward	389.2
8	Churchill Ward	
9	Middlesex Ward	359.6
10	Lister Ward	
11	Pagett Ward	484.5
12	Diabetic Care Unit	
18	Annex Corridor	311
21	High Voltage Switch Gear and Plant Room	93.6
23	Catering / Main Restaurant	18.5
24	Podium / Sewage Pump / CHP	515.2
72	Greenacres	165
73	Adult Audiology	55.6
77	Education and Training	379.1
S4	Substation 4	0.9
n.a.	External Hardstandings	3003.6
		150.18

Recommendation

For all concrete elements, concrete can be sent to a local reprocessor and crushed off-site for use as recycled aggregate. Depending on space and programme constraints, concrete may also be crushed on-site may be used as a construction material for the Proposed Development.

Bricks

Locations and Quantities

Table 3 presents the quantities of bricks / blocks in each building where they are assessed as being present.

Table 3 Bricks/ Blocks Location and Quantities

Building Number	Building Name	Approximate Quantity (m^3)
1	Alderbourne Unit	185
2	Geriatric Day Hospital	147
3	Beaconsfield	125.6
5	Quebec Ward	93.1
6	Pinewood Ward	54.3
7	Osterley Ward	141.1
8	Churchill Ward	
9	Middlesex Ward	106.5
10	Lister Ward	
11	Pagett Ward	241.3
12	Diabetic Care Unit	
18	Annex Corridor	55.4
21	High Voltage Switch Gear and Plant Room	59
77	Education and Training	346

Recommendation

It is assumed that any bricks which are in good condition will not meet the requirements of the Proposed Development and therefore would not be suitable for re-use on-site. However, these bricks may be sent off-site for re-use or recycling.

Tiles

Locations and Quantities

Table 4 presents the quantities of roof tiles in each building where they are assessed as being present. Due to access constraints, it is not possible at this stage to estimate the quantities of ceramics in internal fixtures and fittings (e.g. WCs and basins).

Table 4 Roof Tiles Location and Quantities

Building Number	Building Name	Approximate Quantity (tonnes)
1	Alderbourne Unit	53.2
2	Geriatric Day Hospital	30.4
3	Beaconsfield	71.4
11	Pagett Ward	3.6
12	Diabetic Care Unit	
18	Annex Corridor	0.7
21	High Voltage Switch Gear and Plant Room	
77	Education and Training	37.8

Recommendation

Due to the adhesive binding the tiles and the time required to carefully remove them without breakage, it is recommended that these materials are segregated, so that they can be crushed and recycled off-site. Internal fixtures (e.g. WCs and basins) can be removed and taken off-site where they may be prepared for re-use or crushed and recycled.

Metals

Locations and Quantities

Table 5 presents the quantities of metals in each building where they are assessed as being present.

Table 5 Metals Location and Quantities

Building Number	Building Name	Approximate Quantity (kg)	
		Iron and steel	Aluminium
1	Alderbourne Unit	25853	5261
2	Geriatric Day Hospital	18425	n/a
3	Beaconsfield	40408	n/a
5	Quebec Ward	2240	n/a
6	Pinewood Ward	2240	n/a
7	Osterley Ward	4880	n/a
8	Churchill Ward		
9	Middlesex Ward	4880	n/a
10	Lister Ward		
11	Pagett Ward	4880	n/a
12	Diabetic Care Unit		
18	Annex Corridor	13372	n/a
21	High Voltage Switch Gear and Plant Room	10435	n/a
23	Catering / Main Restaurant	1872	n/a
24	Podium / Sewage Pump / CHP	75.6	n/a
72	Greenacres	8790	n/a
73	Adult Audiology	3114	n/a
77	Education and Training	26478	n/a

Recommendation

- For all metal found on Site, it is recommended that it is taken off-site to be recycled.

Suspended Grid Mineral Ceiling Tiles

Locations and Quantities

Table 6 presents the quantities of suspended grid mineral ceiling tiles in each building where they are assessed as being present.

Table 6 Suspended Grid Mineral Ceiling Tiles Location and Quantities

Building Number	Building Name	Approximate Quantity (m^2)
1	Alderbourne Unit	432
2	Geriatric Day Hospital	90
3	Beaconsfield	218
5	Quebec Ward	430
6	Pinewood Ward	431
7	Osterley Ward	836
8	Churchill Ward	
9	Middlesex Ward	730
10	Lister Ward	
11	Pagett Ward	1109
12	Diabetic Care Unit	
23	Catering / Main Restaurant	90
77	Education and Training	929

Recommendation

Majority of the mineral ceiling tiles will be appropriate for reuse off-site. Where it is not possible for mineral ceiling tiles to be reused, it is recommended that they are recycled via a ceiling recycling programme.

Plastics (Including Vinyl Sheets)

Locations and Quantities

Table 7 presents the quantities of plastics in each building where they are assessed as being present.

Table 7 Plastics Location and Quantities

Building Number	Building Name	Approximate Quantity (m^2)
1	Alderbourne Unit	922
5	Quebec Ward	430
6	Pinewood Ward	431
7	Osterley Ward	836
8	Churchill Ward	
9	Middlesex Ward	730
10	Lister Ward	
11	Pagett Ward	1109
12	Diabetic Care Unit	
18	Annex Corridor	920
23	Catering / Main Restaurant	90
72	Greenacres	51
73	Adult Audiology	12
77	Education and Training	172

Recommendation

- It is recommended that plastics are taken off-site to be recycled.

Textiles

Locations and Quantities

Table 8 presents the quantities of textiles in each building where they are assessed as being present. In the majority of cases, it was not possible to determine the presence of textiles due to the desk-based nature of the audit: those buildings listed below are only those where information was provided to confirm the presence of carpets.

Table 8 Textiles Location and Quantities

Building Number	Building Name	Approximate Quantity (m^2)
1	Alderbourne Unit	330
72	Greenacres	430
73	Adult Audiology	166
77	Education and Training	516

Recommendation

Where the carpets are found on Site to be of good quality and in good condition, it can be reused off-site. However, where the condition of carpet is poor quality and/or condition, then off-site recycling is recommended.

Timber and Timber Products

Locations and Quantities

Table 9 presents the quantities of timber and timber products in each building where they are assessed as being present.

Table 9 Timber and Timber Products Location and Quantities

Building Number	Building Name	Approximate Quantity		
		Timber (m^3)	Timber – Untreated Doors (m^2)	Fibreboard (kg)
1	Alderbourne Unit	69.4	164.96	n/a
2	Geriatric Day Hospital	42.7	110.58	n/a
3	Beaconsfield	83.8	143.21	n/a
5	Quebec Ward	14.82	68.89	2500
6	Pinewood Ward	15.96	65.26	2500
7	Osterley Ward	29.82	105.14	5000
8	Churchill Ward			
9	Middlesex Ward	27.8	123.27	4440
10	Lister Ward			
11	Pagett Ward	26.46	175.84	4754
12	Diabetic Care Unit			
18	Annex Corridor	36.8	n/a	n/a
24	Podium / Sewage Pump / CHP	2.2	n/a	n/a
72	Greenacres	46.6	59.82	n/a
73	Adult Audiology	18	43.51	n/a
77	Education and Training	14.5	81.58	n/a
S4	Substation 4	18.2	n/a	n/a

Recommendation

● Where possible, it is recommended that high quality timber such as good quality doors in good condition are taken off-site and reused.

● Where high quality solid timber cannot be reclaimed, it is recommended that it is taken off-site for recycling.

● Where reuse outlets cannot be secured, or recycling is not possible (due to the finish on the doors or the composite nature of other timber products, e.g. fibreboard), it is recommended that the timber is sent for energy recovery.

Glass

Locations and Quantities

Table 10 presents the quantities of glass in each building where it is assessed as being present.

Table 10 Glass Location and Quantities

Building Number	Building Name	Approximate Quantity (m^2)
1	Alderbourne Unit	86.4
2	Geriatric Day Hospital	97.9
3	Beaconsfield	113.56
5	Quebec Ward	51.84
6	Pinewood Ward	77.56
7	Osterley Ward	122.2
8	Churchill Ward	
9	Middlesex Ward	93.4
10	Lister Ward	
11	Pagett Ward	93.6
12	Diabetic Care Unit	
18	Annex Corridor	859.2
23	Catering / Main Restaurant	90
72	Greenacres	72
73	Adult Audiology	40.32
77	Education and Training	79.68

Recommendation

- It is recommended that glass is sent off-site, to be crushed and recycled.

Plasterboard (Other Gypsum Material)

Locations and Quantities

Table 11 presents the quantities of plasterboard in each building where it is assessed as being present.

Table 11 Plasterboard (Other Gypsum Material) Location and Quantities

Building Number	Building Name	Approximate Quantity (m^3)
1	Alderbourne Unit	37
2	Geriatric Day Hospital	26.2
3	Beaconsfield	53.8
5	Quebec Ward	6.18
6	Pinewood Ward	8.68
7	Osterley Ward	12.4
8	Churchill Ward	
9	Middlesex Ward	12.4
10	Lister Ward	
11	Pagett Ward	8.31
12	Diabetic Care Unit	
18	Annex Corridor	3.8
72	Greenacres	18.6
73	Adult Audiology	7.8
77	Education and Training	4.3

Recommendation

Gypsum-based waste, including plasterboard, must be segregated on-site. Once segregated, this waste can be sent off-site with a specialist contractor to be recycled.

Bituminous Material (Asphalt)

Locations and Quantities

Table 12 presents the quantities of bituminous material in each building where it is assessed as being present.

Table 12 Bituminous Material (Asphalt) Location and Quantities

Building Number	Building Name	Approximate Quantity (m^3)
1	Alderbourne Unit	4.8
2	Geriatric Day Hospital	2.95
3	Beaconsfield	4.2
5	Quebec Ward	1.2
6	Pinewood Ward	1.2
7	Osterley Ward	2.3
8	Churchill Ward	
9	Middlesex Ward	1.82
10	Lister Ward	
11	Pagett Ward	1.93
12	Diabetic Care Unit	
18	Annex Corridor	5.7
21	High Voltage Switch Gear and Plant Room	1.38
23	Catering / Main Restaurant	0.5
24	Podium / Sewage Pump / CHP	4.36
73	Adult Audiology	
77	Education and Training	1.94

Recommendation

● Subject to the acceptance criteria and whether the bituminous material is classified as hazardous waste, it is recommended it is sent for either energy from waste, or for disposal at landfill as a last resort.

Lighting

Locations and Quantities

Lighting (including fluorescent tubes and Light Emitting Diodes (LED)) will be present, however, at present it is not possible to quantify this because of the lack of internal access.

Recommendation

The reuse of lightbulbs and their fixtures is likely impractical; it is therefore likely that fluorescent and LED lighting would be taken off-site and recycled, whereas older incandescent lightbulbs would be sent for energy recovery.

Insulation

Locations and Quantities

Table 12 presents the quantities of bituminous material in each building where it is assessed as being present.

Table 13: Insulation Location and Quantities

Building Number	Building Name	Other construction materials containing asbestos (kg)	Fibreglass (m3)	Polystyrene - m3
1	Alderbourne Unit		210	
2	Geriatic Day Hospital		115	
3	Beaconsfield		227	
5	Quebec ward	2760	65	12.2
6	Pinewood ward	2760	65	12.2
7 & 8	Osterley ward & Churchill ward	5520	142.5	24.4
9 & 10	Middlesex ward & Lister ward	5520	110	24.4
11 & 12	Pagett ward & Diabetic care unit	5520	142.5	24.4
18	Annex corridor (partial)			
21	Switch gear and plant room			279
72	Greenacres		131	
73	Adult audiology		48	
77	Education & Training		103	

Recommendation

The off-site recycling of polystyrene is potentially feasible. Asbestos will need to be safely removed and disposed of to landfill. It is likely that fibreglass would also require landfill disposal.

Identified Materials and Estimated Quantities

Estimated quantities of the materials anticipated to be generated during the demolition process are provided in Table 14. The estimated volumes are based on the audit and do not consider the actual skip volumes that may result from the Site (i.e., does not account for bulking and the inevitable voids within the skip during disposal).

Table 14. Estimate Quantities of Materials / Waste

Material	European Waste Catalogue Code	Weight[6] (Tonnes)	% of Total Material	Material Recovery Potential (%) (Best Practice)[7]	Material Recovery Potential (Tonnes)	Disposal to Landfill/Energy From Waste (Tonnes)
Other insulation materials	17-06-04	25	0%	50%	13	13
Other construction materials containing asbestos	17-06-05*	22	0%	0%	-	22
Concrete	17-01-01	19,653	74%	100%	19,653	0
Bricks	17-01-02	1,711	6%	100%	1,711	0
Wood - untreated	17-02-01	1,180	4%	95%	1,121	59
Glass - uncontaminated	17-02-02	113	0%	100%	113	0
Treated wood, glass, plastic (alone or in mixtures) containing hazardous substances	17-02-04*	50	0%	0%	-	50
Textiles	20-01-11	64	0%	100%	64	0
Other bituminous mixtures	17-03-02	28	0%	0%	-	28
Aluminium	17-04-02	5	0%	100%	5	0
Iron and steel	17-04-05	167	1%	100%	167	0
Other soil and stones	17-05-04	3,248	12%	100%	3,248	0
Other gypsum materials	17-08-02	120	0%	95%	114	6
Total		26,386			26,208	178

Note: Numbers may not add up, due to rounding. The material recovery potential (%) is sourced from Waste and Resources Action Programme Best Practice (WRAP: Achieving good practice Waste Minimisation and Management (Guidance for construction clients, design teams and contractors). Where information in relation to material recovery potential is not available for specific materials, professional judgement has been used.

[6] Following densities were used to convert m^3 to tonnes – Concrete: 2.7 – 2.8 t/m^3, Masonry (Bricks): 1.4 t/m^3, Timber – 0.5 -0.75 t/m^3, Glass – 2.6 t/m^3, Textiles – 1.5 t/m^3, Grid Tiles – 3 t/m^3, Plastics – 1.1 t/m3, Metals – 0.03 – 7.85 t/m^3, Plasterboard – 0.6 t/m^3

[7] WRAP – Achieving good practice Waste Minimisation and Management (Guidance for construction clients, design teams and contractors)

Waste Management Opportunities

The key shown in Table 15 has been adopted to show the benefits of each waste/material opportunity.

Table 15 Material Opportunities Benefits Key

Key	Description of Benefit
	Reduction in landfill costs.
	Reduced environmental impact.
	Less carbon/energy intensive.
	Preserve natural resources.
	Corporate social responsibility.

Potential opportunities for reusing and recycling the materials/waste generated on Site as well as the benefits of such initiatives have been identified in Table 16 of this Report.

There are several opportunities to apply the waste hierarchy and circular economy to the areas within the Site to be demolished, and examples of local reprocessing and recycling facilities have been identified where appropriate in this Report. However, this assessment is not intended to present an exhaustive list of these facilities. The final choices of the recommendations made within this Report will need to be determined by the contractor, based on the costs and benefits of the options presented. There are clear benefits to implementing waste minimisation initiatives, these include:

- Reducing costs associated with disposal;
- Realising financial benefits by diverting waste from landfill; and
- Environmental and social benefits of implementing the waste hierarchy and circular economy.

Table 16. Materials / Waste Management Opportunities

Key Materials	Circularity Rating	Suggestion	Benefits	Constraints	Example reuse / reprocessors / recyclers
Concrete		Off-site recycling		Additional space to keep materials segregated.	Table 17 provides a list of recycling companies which may be able to collect / process waste concrete.
Bricks and Masonry		Based on the condition and quality (subject to testing) - Reuse and Recycling		Additional space to keep materials segregated to then transport off-site for crushing. Additional time in the demolition programme will have to be allowed and it is likely to incur increased demolition costs, however, there will be a resale value for the bricks and it would considerably reduce the amount of material that is downcycled for secondary aggregates.	Globe Chain is a reuse marketplace that connects companies with charities, SMEs and individuals to redistribute unneeded construction material while collating social, environmental and economic data. GlobeChain: https://www.globechain.co.uk Salvage opportunities for bricks: https://www.salvoweb.com
Tiles and Ceramics		Off-site Recycling		Additional space to keep materials segregated.	GlobeChain: https://www.globechain.co.uk
Metals		Off-site Recycling		Additional space to keep materials segregated.	European Metal Recycling (EMR) is a company which specialises in the collection of, and recycling of scrap metal waste streams. EMR: https://uk.emrgroup.com/
Suspended Grid Mineral Ceiling Tile		Subject to demand and quality, reused off-site or recycled.		Additional space required to keep material segregated.	Armstrong Ceiling Solutions have a recycling service for acoustic ceiling tiles. Armstrong: https://www.armstrongceilings.com/commercial/en/performance/sustainable-building-design/ceiling-recycling-program.html GlobeChain: https://www.globechain.co.uk
Plastics (including vinyl sheets)		Plastics (polycarbonate skylights) found on site can be recycled into other products such as dashboards, battery boxes.		Additional space to keep materials segregated.	Recovinyl offers a takeback scheme for vinyl flooring via Axion Group. Recovinyl: https://axiongroup.co.uk/services/specialist-collection-schemes/recovinyl/

Key Materials	Circularity Rating	Suggestion	Benefits	Constraints	Example reuse / reprocessors / recyclers
		Smooth uplifted vinyl may be recycled into secondary products.			
Textiles		Off-site Recycling.		Additional space to keep materials segregated.	Interface offers a take back scheme which allows used carpet tiles to get reused by charies, local businesses and others. Interface: https://www.interface.com/EU/en-GB/products/carpet-tile/reentry-en_GB Envirocycle London provdes a carpet tile re-use programme. Envirocycle: https://envirocyclelondon.com/recycle-office-carpet-tiles/
Timber and Timber Products		Off-site Reuse and Recycling.		Additional space to keep materials segregated.	GlobeChain: https://www.globechain.co.uk Community Wood Recycling are able to reclaim wood for re-use. Community Wood Recycling: https://communitywoodrecycling.org.uk/
Glass		Off-site Recycling.		Additional space to keep materials segregated.	The following are providers of glass recycling services, UK wide. May Glass Recycling: https://www.mayglassrecycling.co.uk/services Nationwide Waste Services: https://www.nationwidewasteservices.co.uk/recycling/ Guardian Glass: https://www.guardianglass.com/gb/en
Plasterboard (Other gypsum materials)		Off-site Recycling.		Additional space to keep materials segregated. .	Junk Removals London provide a plasterboard collection and recycling service, which is suitable for old, used plasterboard. Junk Removals London: https://junkremovalslondon.com/plasterboard-collection/
Bituminous Material		Off-site disposal or energy recovery.		Additional space to keep materials segregated.	
Lighting (low energy light bulbs or fluorescent light tubes)		Only low energy light bulbs and fluorescent light tubes are recyclable. Incandescent (old-fashioned) light bulbs cannot be recycled.		Additional disposal costs.	Recolight provide a collection and recycling service for WEEE lighting and electricals. Recolight: https://www.recolight.co.uk/ GlobeChain: https://www.globechain.co.uk Salvage opportunities for lighting: https://www.salvoweb.com

Waste contractors in the area that collect multiple construction streams (segregated) are shown in Table 17. This list is not intended to be comprehensive, and waste generators will need to meet their legal duty of care by making sure that any waste produced is managed responsibly and only given to businesses authorised to take it. The presence of a company on the list below does not remove the requirement for waste generators to carry out their own duty of care checks.

Table 17. London Waste Companies which collect multiple Construction, Demolition and Excavation (CD&E) Waste Streams

Waste Company	Website Hyperlink
Capital Waste	https://capwaste.co.uk/
London Waste Removal Service	www.Londonwasteremovalservice.co.uk/demolition
O'Donovan Waste Disposal	https://www.odonovan.co.uk/
Junk Bird Limited	https://junkbunk.co.uk/
Swift Waste Management	https://swiftwaste.co.uk/
Powerday	https://powerday.co.uk/
Bywaters	https://www.bywaters.co.uk/

General Practical Guidance for Demolition Materials and Waste

This pre-demolition audit has been conducted to allow material and waste management to be considered in the early stage of the project. The Client, Architect and Demolition Contractor should be involved in the material and waste management process from the offset. This will allow for effective planning to realise the value of materials on-Site and their subsequent management (i.e., consideration of the waste hierarchy).

The reuse of material on-Site or on a nearby similar project is the ideal option from an environmental and economic perspective. The Client and Architect are best positioned to consider these options and enable these initiatives. Doing so also often results in reduced transportation, reducing embodied CO2 emissions and costs associated with material management on the project. To maximise this opportunity, it is advised that the following are considered:

- Opportunities for reuse on-Site;
- Safe storage of these items on-Site, in a separate storage area if feasible;
- Opportunities for reuse by the Client on other projects;
- Opportunities for reuse on local/similar projects;
- Advertisement of specific items on websites (e.g., www.salvo.co.uk);
- Contacting local architectural salvage merchants about specific items; and
- Selling or gifting items locally.

Waste arisings during demolition works should be continually monitored to provide a thorough understanding of the types and amounts of waste coming from the Site. This data collection will help with the continual improvement of material and waste management on-Site. Data collection can also be used to help set more demanding waste segregation targets for future demolition and refurbishment projects.

Recommendations and Next Steps

The type and quantities of material present on-Site have been identified, and opportunities to apply the principles of waste hierarchy and Circular Economy applied to different material types, with local reprocessing and recycling facilities identified. Ahead of demolition works taking place, the following recommendations and next steps are suggested:

- Lifecycle analysis of new construction materials for the Proposed Development, in conjunction with the reuse/recycling of materials as identified in this Report.
- Embed the recommendations within this Report in the design process at pre-tender stage so the measures in relation to reuse and recycling targets are included in the awarded demolition contract.
- Engagement with construction material suppliers to explore opportunities for takeback schemes.
- Where takeback schemes with suppliers are not possible, it is recommended that early engagement with reprocessing and recycling companies take place, in order to best capture recyclable materials and avoid downcycling.
- It is recommended that the materials identified within this Report are incorporated into a Site Waste Management Plan (SWMP)/Construction Resource Management Plan (CRMP) for effective management of waste. This is considered good practice on all construction projects and is a key step in facilitating diversion from landfill.
- Identify storage areas on-Site as appropriate for the types and quantities of waste anticipated to be produced during demolition. These areas should allow for the successful segregation of waste, as appropriate to avoid contamination of the different waste and material streams.

- All staff should have appropriate levels of training to enable the segregation of waste is achieved. Waste management information should be included within the Site induction for all personnel. It is recommended that a Reporting procedure SWMP/CRMP is put in place to catalogue the materials/waste produced, which is regularly updated. This will allow for the appropriate organisation of the transport for materials/waste on-Site and prevent stock piling.
- Further to this, it is recommended that a Waste Champion is nominated by the Principal contractor to facilitate management of the SWMP/CRMP. This role would also aim to allow that the waste hierarchy is considered at all times, with the emphasis being on reducing, reusing, and recycling before landfill disposal is considered.

Once the Demolition Contractor is commissioned to undertake the demolition, the following should be considered:

- The Demolition Contractor should engage all contractors in the process of maximising high-grade re-use and recycling opportunities, and
- The Demolition Contactor should refer to the Pre-Demolition Audit Report in the SWMP/CRMP.

Further Information

In addition to the resources detailed in Table 16 of this Report, further information pertaining to the sustainable waste management for construction projects can be found through the following sources:

- Bioregional, Reclaimed Buildings Product Guide: https://www.bioregional.com/resources/reclaimed-building-products-guide
- SmartWaste: Provides waste measurement, Site Waste Management Planning and benchmarking tools: http://www.smartwaste.co.uk/

aecom.com