

Recycling and Re-Use of Materials Strategy

Toxo Construction Ltd

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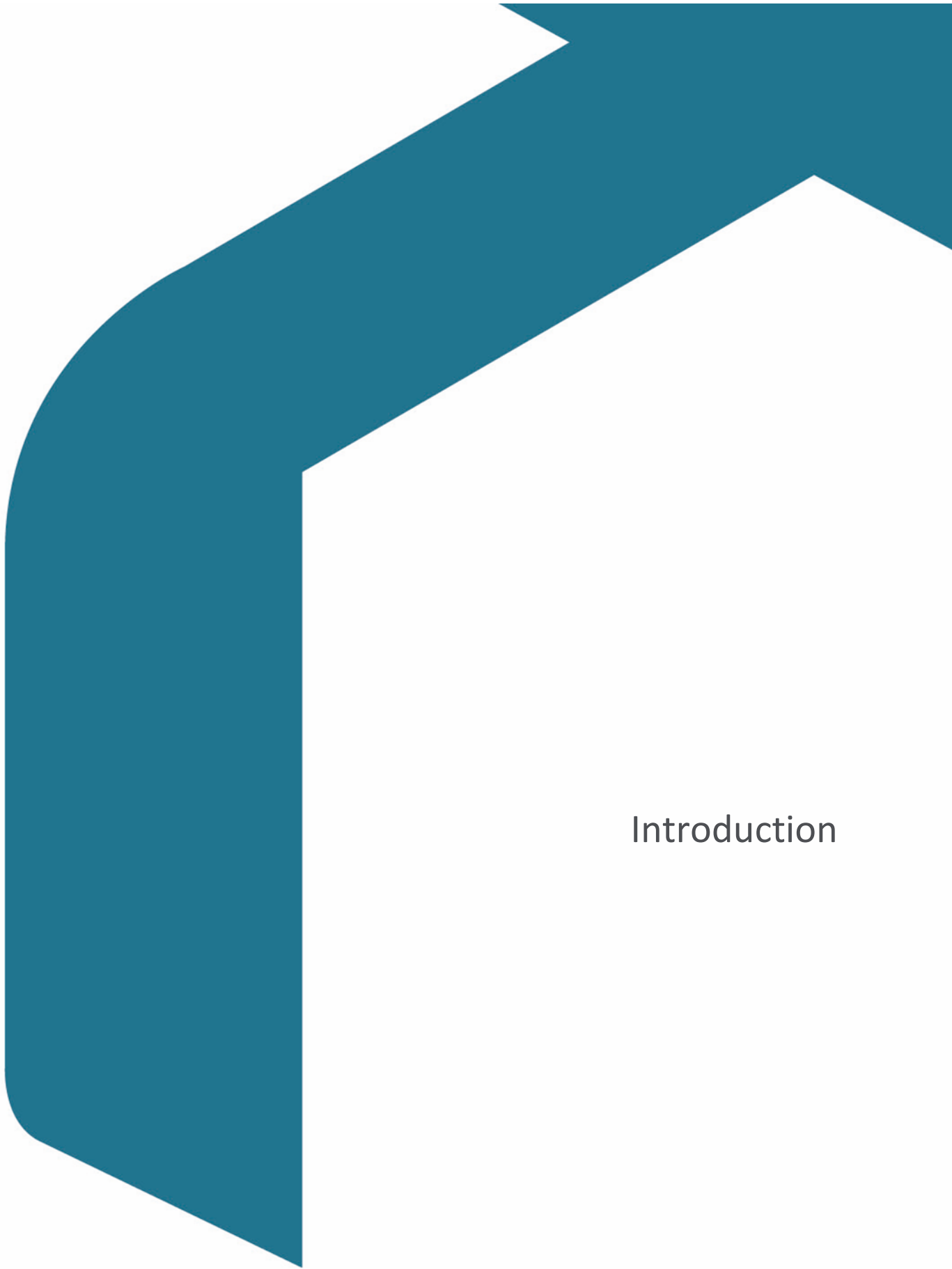


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Introduction

1.0 Introduction

This Recycling and Re-Use of Materials Strategy has been prepared by SRE on behalf of Toxo Construction Limited to demonstrate the broad strategy for the Application with regards to demolition and construction waste in line with the London Borough of Camden Planning Policy.

This strategy outlines the requirements for waste management on the site, how key this is to reducing environmental degradation and how, through careful processing and management of waste, the quantity of waste heading to landfill can be reduced significantly.

Through the utilisation of the analysis of materials from the Whole Life Carbon Assessment also undertaken by SRE, this strategy aims to estimate the volume of certain materials and outline how these will be handled on site to prevent the use of landfill as a primary means of disposal.

The Site currently consists of a ~1880's residential dwelling which has been extended numerous times over its lifetime and is consequently a mix of architectural styles and construction quality as a result. The Proposed Development consists of the removal of the existing structure and the construction of a new residential dwelling comprising a 5-bedroom detached dwelling, constructed over 4 no. floors, including basement.

Overall, the Proposed Development provides high levels of energy efficiency which will outperform the currently consented new-build dwelling (ref. 2019/4220/P) for whole life carbon emissions, and provide a modern, high quality and efficient family dwelling.



Figure 1 – Front Elevation of the Proposed Development (Charlton Brown Architecture & Interiors)

Relevant Planning Policy & Conditions

Planning Policy & Conditions	Requirement
London Borough of Camden Local Plan	<i>Policy CC5: Waste</i> <i>“The Council will seek to make Camden a low waste borough. We will:</i> <i>a. aim to reduce the amount of waste produced in the borough and increase recycling and the reuse of materials to meet the London Plan targets of 50% of household waste recycled/composted by 2020 and aspiring to achieve 60% by 2031;</i> <i>b. deal with North London’s waste by working with our partner boroughs in North London to produce a Waste Plan, which will ensure that sufficient land is allocated to manage the amount of waste apportioned to the area in the London Plan;</i> <i>c. safeguard Camden’s existing waste site at Regis Road unless a suitable compensatory waste site is provided that replaces the maximum throughput achievable at the existing site; and</i> <i>d. make sure that developments include facilities for the storage and collection of waste and recycling</i>
Planning Condition 14	<i>Maximise reuse of original materials on site</i> <i>Prior to commencement of any works, including demolition, a Recycling and Re-Use of Materials Strategy shall be submitted to and approved by the Local Planning Authority in writing. This should include the re-use of bricks and tiles.</i> <i>The strategy shall demonstrate the approach for diverting 95% of site waste from landfill, comply with the Institute for Civil Engineer's Demolition Protocol, and maximise reuse of materials on-site before salvaging appropriate materials to enable their reuse off-site.</i>

This document has been undertaken to address Policy CC5 and Planning Condition 14 and aligns with the Institute of Civil Engineering demolition protocol.

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Recycling and Reuse of Materials Strategy

2.0 Recycling and Re-Use of Materials Strategy

2.1 Waste In Context

According to the Department for Environment Food and Rural Affairs (DEFRA) UK Statistics on Waste (March 2020)¹ in 2016, Construction, Demolition and Excavation generated 136.2 million tonnes of waste. This is compared to 27.3 million tonnes from households and 39.8 million tonnes from other commercial and industrial processes.

Of the total waste generated in the UK, the above report states that 52.3 million tonnes was sent to landfill, with an upward trend of 8% when compared to 2014.

Despite the high volumes of waste generated by Construction and Demolition in the UK, the recovery rate of waste from the types of waste is also high. Recovery of waste represents the utilisation of waste for any purpose which would otherwise require new materials to fulfil a particular function. 2016 figures from the DEFRA report show that the recovery rate of Construction and Demolition (non-hazardous waste) is approximately 91%.

The figures within the DEFRA report outline the key issues facing the Construction industry and show that the reduction of waste generated from construction (and associated activities) can make a significant contribution to the overall reduction of waste generation in the UK.

2.1.1 Construction Waste Challenges

One of the key challenges facing the construction industry is that the activities within this section generally produce significant quantities of waste which cannot be readily recycled or be processed via energy recovery. Key building materials such as bricks, tiles, concrete etc. cannot be recycled for instance, and neither can they be combusted to produce energy.

The above challenge results in pressure being placed on the industry to mitigate waste at the design stage and reduce the quantity of waste being removed from the site, thus lowering landfill waste quantities.

On a positive note, construction waste (with some exceptions) is generally non-toxic and inert, and therefore poses little wider threat to the environment beyond that associated with its final disposal.

2.2 The Existing Site and Procurement

2.2.1 Contracts and Tender Implementation

The contracts for both demolition and construction will state the requirement for the contractor to undertake a Construction Resource Management Plan. Appendix A – ICE Demolition Protocol Checklist and this strategy document will be provided as part of the tender documentation.

2.2.2 Reuse and Repurposing Assessment

The existing dwelling on site consists of a c.1880's residential dwelling which has been extended numerous times over its lifetime, and is consequently a mix of architectural styles and construction quality. This piecemeal approach to the development of the dwelling has led to a layout, external appearance, and quality of construction which is not suitable for extensive refurbishment, and which would not meet modern design standards or expectation of a large, modern, family home.

Based on the above, it has been deemed that the existing dwelling cannot be refurbished or repurposed to form the basis for the new dwelling proposed on the site due to the low quality materials used in some cases, and the need for significant realignment of the fabric to meet modern needs.

¹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/918270/UK_Statistics_on_Waste_statistical_notice_March_2020_accessible_FINAL_updated_size_12.pdf

None-the-less, key items of the construction materials will be incorporated within the new build construction as a matter of course, and will form a key part of the materials sourcing strategy for the site, with the overall aim of significantly reducing the waste removed from the site during the demolition and construction phases.

2.3 The Broad Waste Strategy

As an overall strategy for the site, the waste arising from the demolition and construction phases will be dealt with in accordance with the waste hierarchy to reduce the volume of waste diverted to landfill and also transported from the site.

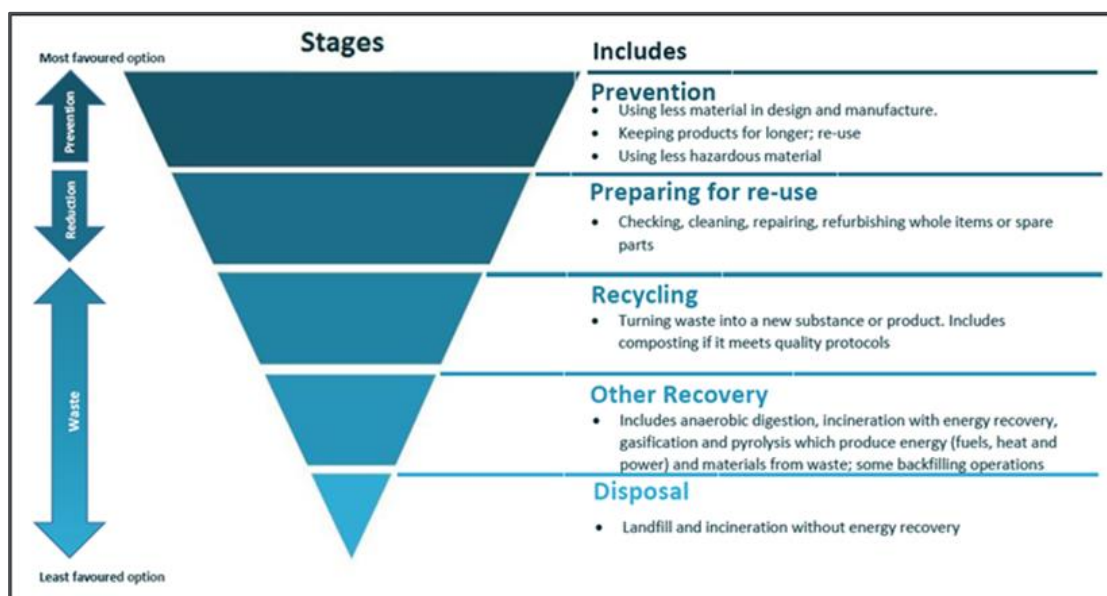


Figure 2 - The waste hierarchy

The use of the Waste Hierarchy as a general strategy underpins the more detailed elements of this strategy, and will form an integral part of the overall management of waste during demolition and construction.

Where waste has to be removed from site and is not re-usable, this will be managed through a licenced waste contractor with the following benchmarks for diversion from landfill being targeted in line with Best Practice²:

Type of Waste	Volume	Tonnage
Non-Demolition	85%	90%
Demolition	85%	95%
Excavation	95%	95%

Table 1 – BREEAM New Construction Wst 01 Diversion from Landfill Benchmarks – Exemplary Level

Site waste will be managed on site through a Construction Management Plan which will emphasise the need to minimise waste leaving site and the reuse of materials on site in line with the waste hierarchy. As with the demolition stage of works, waste from the site will be managed via a certified waste contractor and will be monitored through best practice site management procedures.

Quantity of waste diverted from landfill will be in accordance with Table 1 above, with regular reports requested from the waste contractor, and stored as part of ongoing site monitoring and management.

² BREEAM New Construction 2018 – Wst 01 ‘Construction Waste Management’ criteria. (Table 52)

To facilitate the re-use of materials on the site, appropriate areas will be allocated within the Construction Works Plan and associated method statement for the storage of re-usable materials from the demolition and construction phases where it is practicable to do so as part of the overall site management.

Any 'muck away' resulting from the digging out of the basement (or other excavation) will be, where possible, relocated on site to reduce the transportation of waste. Where this is not possible, this will be dealt with in line with the Waste Hierarchy by a licenced waste contractor in line with all other waste from the site.

2.4 Reclamation of Materials

The Proposed Development will implement a mixed Demolition and Deconstruction strategy for the removal of the existing building, with the key internal elements of note, and roofing tiles and timbers being removed. Following this stripping of items of note, conventional demolition will then be undertaken, with the structural materials processed and utilised on site as much as practical.

A reclamation audit will be undertaken on the site prior to any demolition activities to identify any materials of interest that could potentially be salvaged and reclaimed as part of the initial soft-strip process.

Appropriate areas will be highlighted within the Construction Management Plan to allow for the safe and weather-proof storage of these materials in a manner which will prevent degradation, where this is practicable within the overall site management plan.

Reclaimed materials could be reused on site, used on alternative sites, or sold depending on the potential future need. All of these options form part of the diversion from landfill strategy.

Items could include, but not be limited to:

- Items of architectural interest – fireplaces, staircases, tiling & flooring etc.
- Large structural timbers with potential for future use
- Roofing tiles for resale for use on other site

All items of good condition with inherent design or monetary value will be retained with the following hierarchy of proposed use being applied to all elements re-claimed, with the aim of having a decreased volume of waste within each subsequent step of the process.

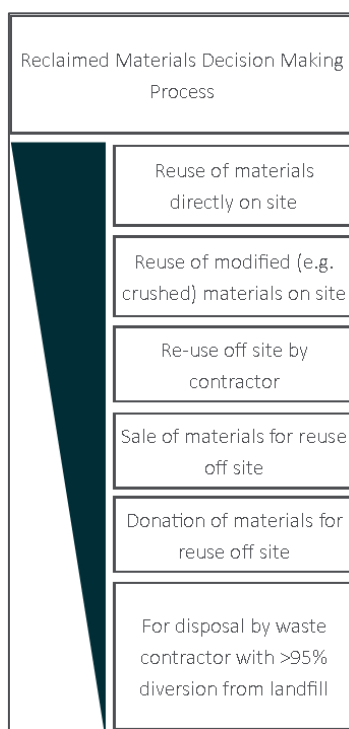


Figure 3: Reclamation of Materials Decision Making Process

2.5 Identifying Waste and Potential for Diversion from Landfill

Key waste arising from the demolition of the existing building has been identified through an initial estimation based on the information available on the site, and the approximate building materials which constitute the existing building.

It should be noted that the current building on the site is of a low quality and therefore the quantity of materials on the site that will be directly re-usable on the site will be minimal. Key items which will be re-usable are the traditional construction materials that have a high potential to be ground down and used as aggregate on site for landscaping, substructure, sub-base for driveways, and backfilling of foundations and basement.

An indicative material schedule containing the significant building materials currently on site can be seen below.

	Anticipated Weight in situ	Percentage re-used on site	Percentage re-used off site	Recycled/recovered through waste contractor	Percentage diverted from landfill
Brickwork	46 tonnes	75	25	0	100
Roofing tiles	13 tonnes	0	100	0	100
Timber – structural	7 tonnes	0	50	50	100
Timber parquet flooring	2.5 tonnes	0	100	0	100
Concrete – foundations, substructure etc	15 tonnes	75	0	25	100

Table 2: Indicative Waste Quantities for Significant Building Materials

2.6 Record Keeping During Demolition and Contents of Construction Management Plan

In line with the requirements of the Institute of Civil Engineers Demolition Protocol, records will be kept on the waste removed from site and as a minimum, the following information will be displayed within these records:

- Identity of the person removing the waste
- Types of waste removed
- Name of the site that the waste was removed from
- Waste carrier registration number
- Copy of, or reference to, the written description of the waste in accordance with the Environmental Protection Act 1990
- Confirmation as to whether the operator of that site holds a permit under the Environmental Permitting Regulations 2007 or is registered under those Regulations as being exempt from such a permit.

And within 3 months of the work being completed:

- Confirmation that the plan is monitored and reviewed regularly
- Where there are deviations from the plan, these are recorded and explained
- A comparison of estimated and actual waste values for each waste type
- An estimate of the cost savings that have been achieved by completing and implementing the Plan

The Construction Management Plan will be updated and reviewed as required, with no more than 6 months between reviews or whenever significant changes to the overall waste strategy are made. Relevant estimates and quantities of waste arising will be amended and records for the following updated:

- Quantity of material re-used on or off site
- Quantity of the materials recycled
- Quantity of material sent for other forms of recovery on or off site
- Quantity of material sent to landfill
- Quantity of materials otherwise disposed of

Appropriate targets for waste will be set for the site, and the intended disposal method, quantifying the amount of waste predicted and its intended disposal method.

An indicative contents of the Plan has been provided within Appendix B & C, with the waste streams recorded as below:

European Waste Catalogue	Key group	Examples
170102	Bricks	Bricks
170101	Concrete	Pipes, kerb stones, paving slabs, concrete rubble, precast and in situ
170604	Insulation	Glass fibre, mineral wool, foamed plastic
1501	Packaging	Paint pots, pallets, cardboard, cable drums, wrapping bands, polythene sheets
170201	Timber	Softwood, hardwood, board products such as plywood, chipboard, medium density fibreboard (MDF)
1602	Electrical and electronic equipment	Electrical and electronic TVs, fridges, air-conditioning units, lamps equipment
1301	Oils	Hydraulic oil, engine oil, lubricating oil
1703	Asphalt and tar	Bitumen, coal tars, asphalt
170103	Tiles and ceramics	Ceramic tiles, clay roof tiles, ceramic, sanitary ware
1701	Inert	Mixed rubble or excavation material, glass
1704	Metals	Radiators, cables, wires, bars, sheet
170802	Gypsum	Plasterboard, plaster, fibre cement sheets
170101	Binders	Render, cement, mortar
170203	Plastics	Pipes, cladding, frames, non-packaging sheet
1705	Soils	Soils, clays, sand, gravel, natural stone
Most relevant EWC	Liquids	Non-hazardous paints, thinners, timber treatments
Most relevant EWC	Hazardous	Defined in the Hazardous Waste List (HWL) of the European Waste Catalogue (EWC)
Most relevant EWC	Floor coverings (soft)	Carpets, vinyl flooring
Most relevant EWC	Architectural features	Roof tiles, reclaimed bricks, fireplaces
170904 (Mixed)	Mixed or other	Efforts should be made to categorise waste into the above categories wherever possible.

Figure 4: Indicative Waste Types Associated with Construction

Based on the current content of waste contained on site, the following 3 no. waste types have been identified as having a high potential for diversion from landfill:

- Bricks – External and internal structure
- Tiles – Roof Covering
- Timber – Roofing Structure

2.7 CO₂ emissions savings from re-use of material on site

Through the reuse of materials on site, CO₂ emissions savings can be estimated from the reduction in haulage traffic generated for the waste movements. Assumptions have been based on the following:

- Waste is transported no more than 60 miles from the site (120 miles round trip)
- Figures are based on an emissions rate of 2.4kg CO₂/mile - ~5 MPG – for an 8 tonne Tipper Truck

As calculated within the table below (Table 3), it is estimated that approximately 17 tonnes of CO₂ could be saved through the re-use of materials on site.

European Waste Catalogue	Key group	Anticipated Weight in situ (tonnes)	Percentage re-used on site	Percentage re-used off site	Recycled/recovered through waste contractor	Percentage diverted from landfill	Waste transported off site (tonnes)
170102	Bricks	46	75%	25%		100%	11.5
170101	Concrete	15	75%		25%	100%	3.75
170604	Insulation	0.1			95%	95%	0.1
1501	Packaging						0
170201	Timber	7		50%	50%	100%	7
1602	Electrical and electronic equipment						0
1301	Oils						0
1703	Asphalt and tar						0
170103	Tiles and ceramics	20		75%	25%	100%	20
1701	Inert						0
1704	Metals	1			100%	95%	1
170802	Gypsum	5			100%	95%	5
170101	Binders						0
170203	Plastics						0
1705	Soils						0
Most relevant EWC	Liquids						0
Most relevant EWC	Hazardous						0
Most relevant EWC	Floor coverings (soft)	1			100%	95%	1
Most relevant EWC	Architectural features						0
170904 (Mixed)	Mixed or other	5			100%	95%	5
		100.1					54.35
	No. 8 tonne trucks	13				No. 8 tonne trucks	7
	2.4kg/CO2/mile assumed Max. 60 mile radius	37.44 tonnes CO2				2.4kg/CO2/mile assumed Max. 60 mile radius	20.16 tonnes CO2
					CO emissions saved from material re-use:		17.28

Table 3: Indicative Waste Arising from Site and Expected Disposal Method

2.8 The Proposed Development

The following section outlines the procedures followed on the Proposed Development to ensure that that the site has been ‘designed for deconstruction’ in line with Circular Economy principles.

Building in Layers

The consideration of the materials used on the site have been selected on multiple basis including the potential for re-use at the end of the buildings useful life. As such, high quality and durable materials are selected to ensure a long and maintenance free lifespan of the building as far as practicable.

A ‘Building in Layers’ approach has been undertaken to ensure that the materials/products installed are:

1. Fit for purpose, durable and of correct specification to ensure longevity of finish.
2. Is of an appropriate type to withstand any wear and tear from their specific location.
3. ‘loose fit’ where appropriate to allow easy replacement when the product reaches end of life.
4. Are as reusable and/or recyclable as possible when finally disposed.

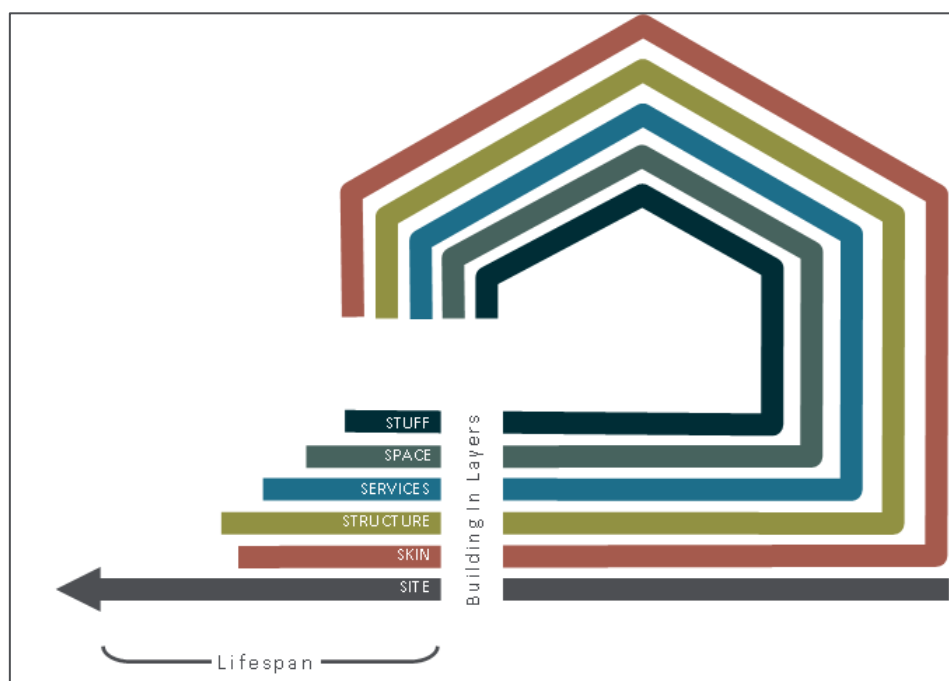


Figure 5 – Building in Layers Diagram

The predominant construction materials on the site are brick, concrete block and timber – all of which are potentially re-usable when the building is demolished.

Brickwork is to be unrendered, and therefore minimising the effort required to clean up the product at the end of use on this site. This is the same as the blockwork on the site, with the majority being internal facing and with a light skim coat of plaster as a finish. As such these main construction materials will be suitable for re-use with minimal effort.

Timber will be adequately protected from the potential for rot, warping and damp to allow this to be reused at the end of life. The majority of timber will be mechanically fixed in place with minimal use of adhesives, resulting in a more effective removal of the material with minimal damage sustained.

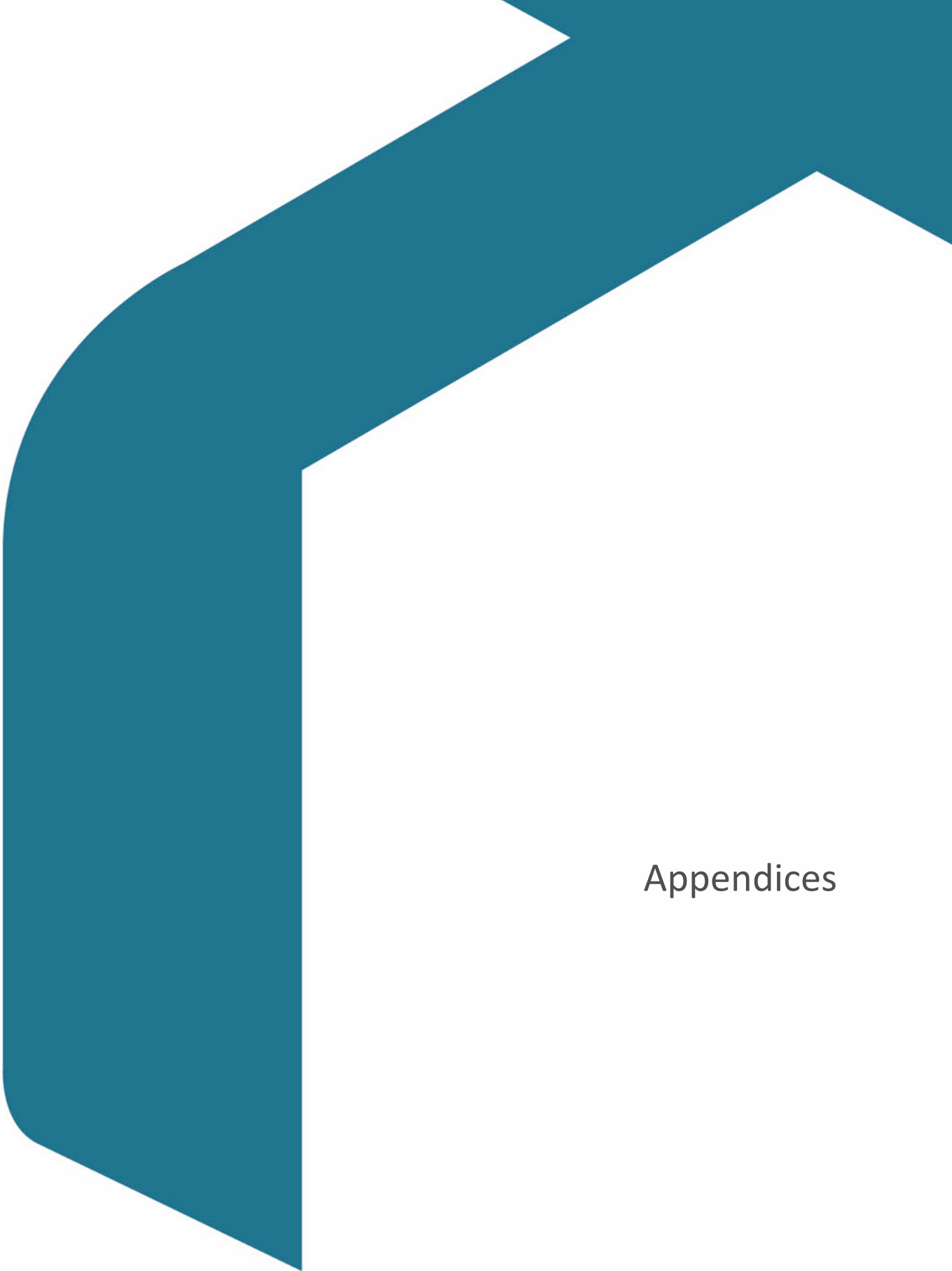
Sustainable Procurement

As part of the procurement process, the use of materials with a high recycled content and/or locally produced will be investigated. In addition, the use of the suppliers and manufacturers with a certified Environmental Management System will also for a key part of the procurement strategy.

The design specification and procurement of lower impact construction products will be enhanced through the use of Environmental Product Declarations (EPDs) on all key materials designed and procured as part of the Proposed Development. As an EPD is an independently verified environmental label in accordance with the requirements of ISO 14025, the reduced risk and environmental impact from poor supplier information will be avoided within the design and construction stages.

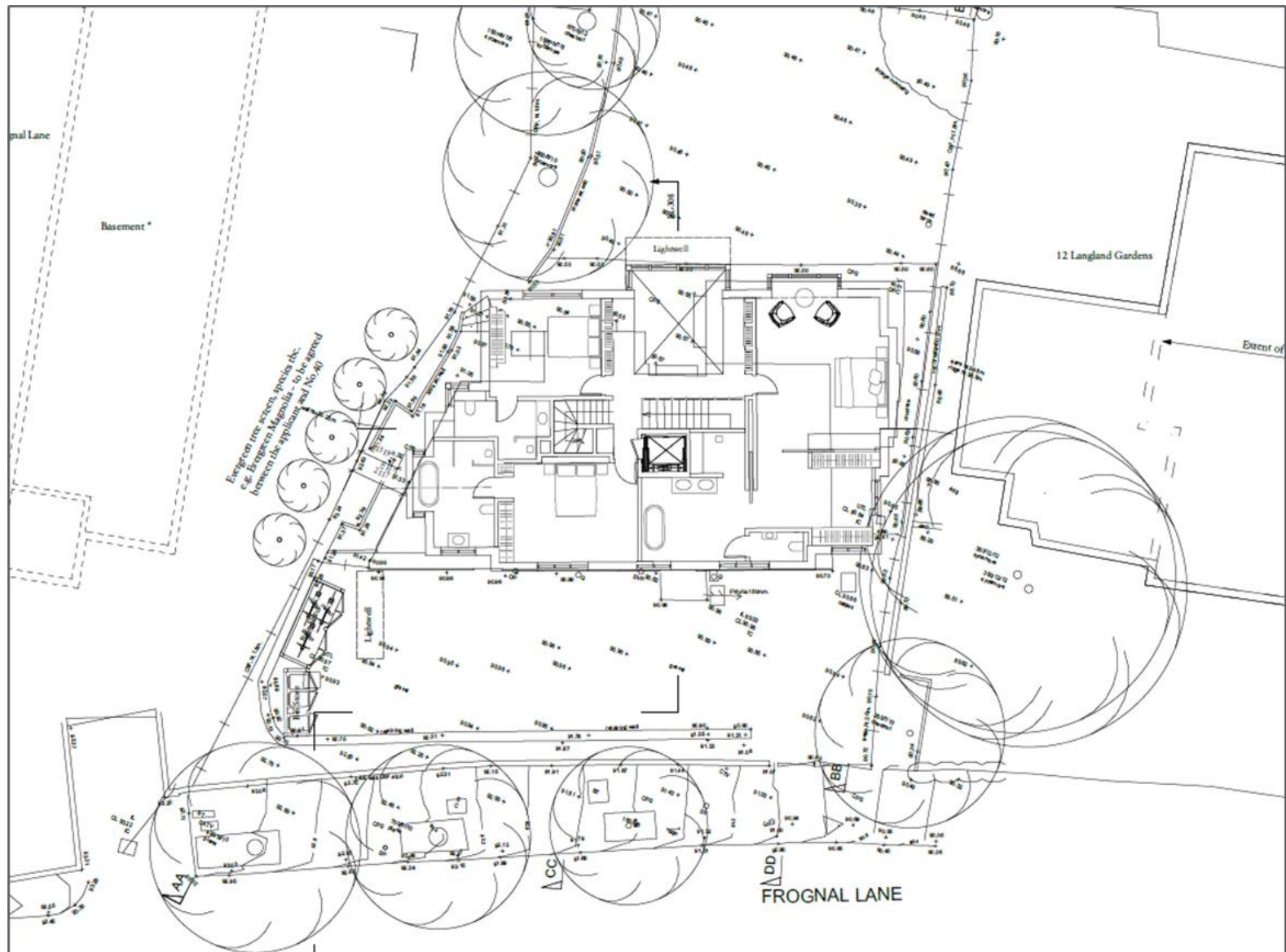
Timber also forms a key part of the design and construction, with timber used in the primary structure, studding of internal and external walls, floor joists and boarding. New timber will be accompanied with appropriate chain of custody certification (FSC/PEFC) ensuring it is from a managed, sustainable supply.

The use of a Sustainable Procurement Plan by the Client and contractor team will manage and inform this process from design through to construction.

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Appendices

Appendix A – Site Plan



Appendix B –Pre-Demolition Waste Audit Template

PRE-DEMOLITION WASTE AUDIT

NOTE:

The audit will be referenced in the RMP and cover:

1. Identification and quantification of the key materials where present on the project
2. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy
3. Opportunities for reuse and recycling within the same development
4. Identification of local reprocessors or recyclers for recycling of materials
5. Identification of overall recycling targets where appropriate
6. Identification of reuse targets where appropriate
7. Identification of overall landfill diversion rate for all key materials.

Project	
Principal	
Contractor	
Site Description	
Site area (m ²)	

Site photos

Overview

E.G.

A pre-demolition waste audit has been undertaken to identify the key materials arising from the clearance of the site. There are no buildings on the site and it consists entirely of hand standing.

The audit aims to identify whether demolition is required and how materials arising can be dealt with in accordance with the waste hierarchy – reduce, reuse, recycle, recover.

“Reduce”

E.G.

Does the building / structure need to be demolished?

Could the structure be retained?

Could the building be refurbished rather than demolished?

The following demolition materials have been identified:

- E.g: tarmac – 350 tonnes approx.

[illegible]

E.G.
How materials will be reused
Which materials can be reused in their current form?

E.G.
How materials will be recycled
When materials on site can't be reused, can they be recycled on site for use in a different form?

No materials have been identified which could be recycled on site for use in a different form

E.G.
Which materials will be sent off site to be recycled externally?
E.G.
All identified materials will be sent off site to be recycled externally through a licenced waste contractor.

E.G.
(ideal response – target a 100% diversion from landfill rate)
No materials will be disposed of to landfill

Appendix C – CRMP Template

Site Waste Management Plan

Responsibility

Name of client	
Name of principal contractor	
Name of person who drafted plan	
Notes, amendments	

Construction Project

Location	
Estimated project cost	
Notes, amendments	

Materials Resource Efficiency

Describe here any methods adopted during the conception, design and specification phase to reduce the amount of waste arising.	
Method	Resource saving (quantify if possible)

Progress Monitoring

We aim to minimise waste going off site through the following procedures (in line with the waste hierarchy):

- Reduce waste creation on site through the correct procurement of material goods to avoid waste, and choosing materials and goods with minimal packaging.
- Reuse as much as practicable of the waste on site within the building structure, substructure and landscaping.
- Recycle as much as possible of the additional waste leaving the site by using a specialist contractor where a specific breakdown of the waste streams diverted from landfill. These reports will be kept on file, and used to complete this SWMP.
- Targets have been set on the predicted amount of waste below which is predicted to be sent off site and/or reused on site. These have been based on the Construction Excellence's Environmental KPI's.

All visitors and contractors to the site will be made aware of this site-wide policy through the site induction scheme.

This Site Waste Management Plan will be updated throughout the construction phase to take into account any changes in legislation and/or Best Practice Principles in relation to site waste management.

Information on the progress of waste recycling by the specialist contractors will be displayed in the site office in graphical form to make all parties aware of site performance, and improvement records.

Waste Reduction:

The following 3 waste groups have been highlighted as having a high potential for diversion from landfill. Quantities of this waste being diverted from landfill will be highlighted within the specialist contractor's report and recorded below within the Waste Management section.

- Xxxxx
- Xxxxx
- Xxxxx

Targets will be set to reduce waste generated on site, with the aim of improving (reducing) the amount of waste generated in relation to the target amounts set.

Waste Management

Declaration		
The client and principal contractor will take all reasonable steps to ensure that – (a) all waste from the site is dealt with in accordance with the waste duty of care in section 34 of the Environmental Protection Act 1990 and the Environmental Protection (Duty of Care) regulations 1991; and (b) materials will be handled efficiently and waste managed appropriately.		
Signatures	Name	Company

Waste Estimation:

Waste Type	Quantity (m3 or tonnes)							
	Re-use on-site	Re-use off-site	Recycling onsite	Recycling offsite	Other form of recovery on-site	Other form of recovery off-site	Sent to landfill	Other disposal
Estimates								
Inert								
Non-Hazardous								
Totals (m3 or tonnes)								
Actual								
Inert								
Non-Hazardous								
Totals (m3 or tonnes)								

Difference between estimates and actual								

Waste Records

* Evidence of waste carrier registration and waste transfer or hazardous waste consignment notes for each removal of waste should be provided either as part of the plan, or filed and cross referenced

Date removed	Waste type	Identity of the person removing the waste	Site the waste is being taken to and whether licensed or exempt	Waste carrier and registration number*	Confirmation of delivery*

If waste is collected through a third part waste contractor, the above 'waste records' section can be deleted, and the report from the waste contractor showing the percentage of waste diverted from landfill attached to the rear of this document.

Waste records show that xx% of the waste has been diverted from landfill through reuse on site, and licenced recycling via waste contractor.

Post-Construction

[Within three months of the construction work being completed]

Confirmation
This plan has been monitored on a regular basis to ensure that work is progressing according to the plan and has been updated to record details of the actual waste management actions and waste transfers that have taken place.
Signature:
Print Name:
Date:

Issue	Details
Explanation of any deviation from the planned arrangements	
Waste forecasts – exceeded	
Waste forecasts – not met	
Cost savings achieved	



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