MEADOW HIGH SCHOOL
HAREFIELD
School Expansion

Circular Economy Statement, Aug 2022
Rev 02

CDC Studio

Issue Status

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Executive Summary

This Circular Economy Statement has been prepared by CDC Studio and the wider project team with regard to a project proposed for an expansion of Meadow High School at a site in Harefield, Hillingdon. The purpose of the statement is to consider how the circular economy policy requirements of the London Plan 2021 can be met.

The project comprises the refurbishment and extension of an existing residential boarding block - with associated landscape and external spaces - to provide a new special school for 90 pupils. In total, the accommodation will comprise approximately 2235m2 GIA.

This document should be read in conjunction with related information submitted with the planning application.

Scope

The report considers strategic approaches to minimising the use of resources and maximising the lifetime circularity of proposed materials. It is intended to identify opportunities to enhance the circular economy aspects of the project and structure future design, construction and maintenance activities through to end-of-life.

The project is supported by the adjacent team members.

Key Considerations

The London Borough of Hillingdon has chosen to retain and refurbish the existing building on the site, retaining services and finishes where possible to support the change of use of the building to the required standards.

- **Re-use/ adaption of existing building skin and structure layers**
- **Adaption/ recycling of building services/ interiors/ stuff layers**
- **Demolition and construction waste 95% diverted from landfill**
- **Building extension using responsible material selection**

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1 Introduction

1.1 Background

The Site

The site is located adjacent to Northwood Road in Harefield, Hillingdon. The site is currently part of Harefield Academy school and contains an existing residential block building which was constructed in 2011 but is currently redundant. The existing building comprises some 1613m2 GIA.

The related site is currently comprised by car parking and an access road, as well as a MUGA games area and areas of soft landscape.

The project proposes to retain the existing building and repurpose it as a special school for 90 pupils (and related staff) as an extension to Meadow High School, Uxbridge. The existing external areas will be resurfaced and reconfigured to provide dedicated external areas for the school.

The space requirements of BB104 for special schools indicate that the existing building is too small to accept all of the accommodation, and so the building is also proposed to be extended with a new extension providing new classroom spaces over a further 622m2 of GIA.

Statement Methodology

The report considers strategic approaches to minimising the use of resources and due care to the potential production of waste. It is intended to identify opportunities to enhance the circular economy aspects of the project and structure future design, construction and maintenance activities through to end-of-life.

The statement has been created with the input of members of the project team which has been coordinated in meetings and via correspondence.

The metrics have been prepared using OneClick LCA and BIM-modelling software (Archicad and Revit) for quantity measurement.

Site Aerial View

Key:

1 Harefield Academy
2 Residential Boarding Block

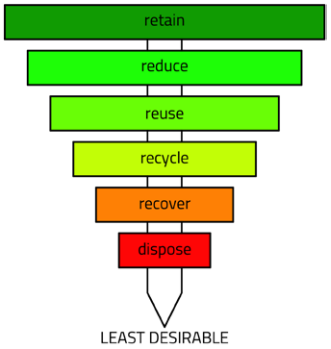
2 Strategy

2.1 Circular Economy Approach

Waste Hierachy

Driving all investigations in this CE Statement is the basic principle of the Waste Hierachy, indicated in the adjacent diagram.

The hierachy encourages the retention of existing materials and components whilst discouraging their passage to disposal in landfill. A circular economy ensures that materials already in use remain available for re-use or recycling.



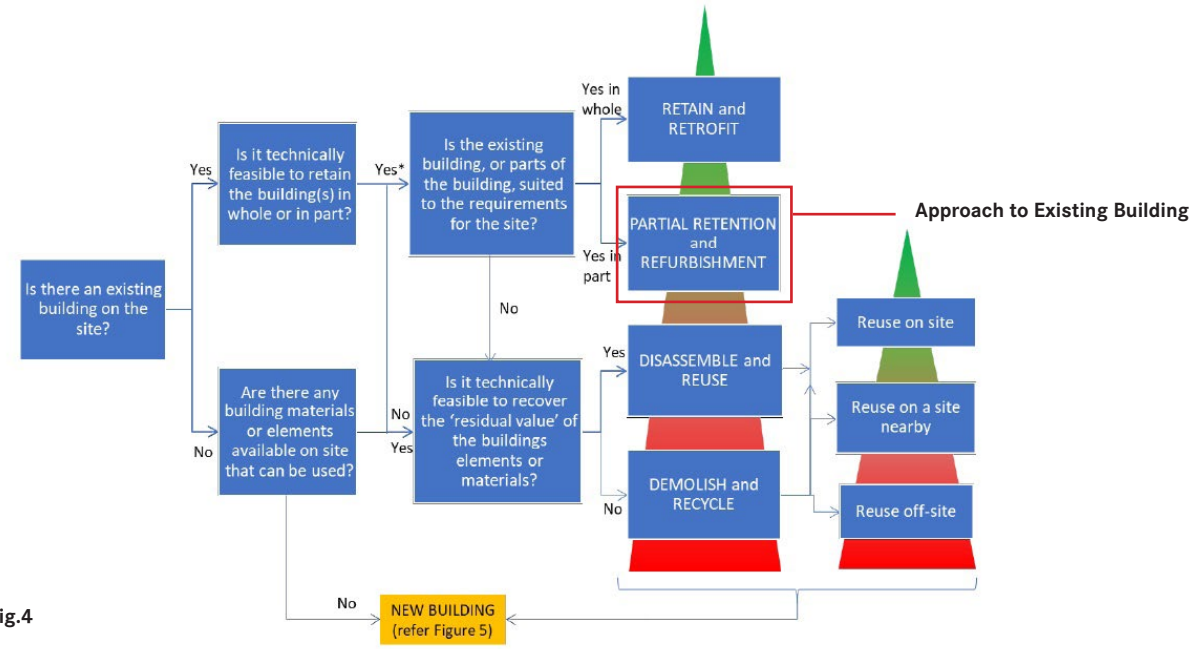
Waste Hierachy

Approach to Existing Building and Site

GLA Circular Economy Statement Guidance 2.4.2 - supporting policy SI 7 - notes that '*retaining existing built structures totally or partially should be prioritised before considering substantial demolition, as this is typically the lowest carbon option*.'

In line with this advice - and the adjacent decision tree also noted in the guidance - the London Borough of Hillingdon and wider project team consider that the existing building should be RETAINED and REFURBISHED, providing a low-carbon and low-waste school on this site.

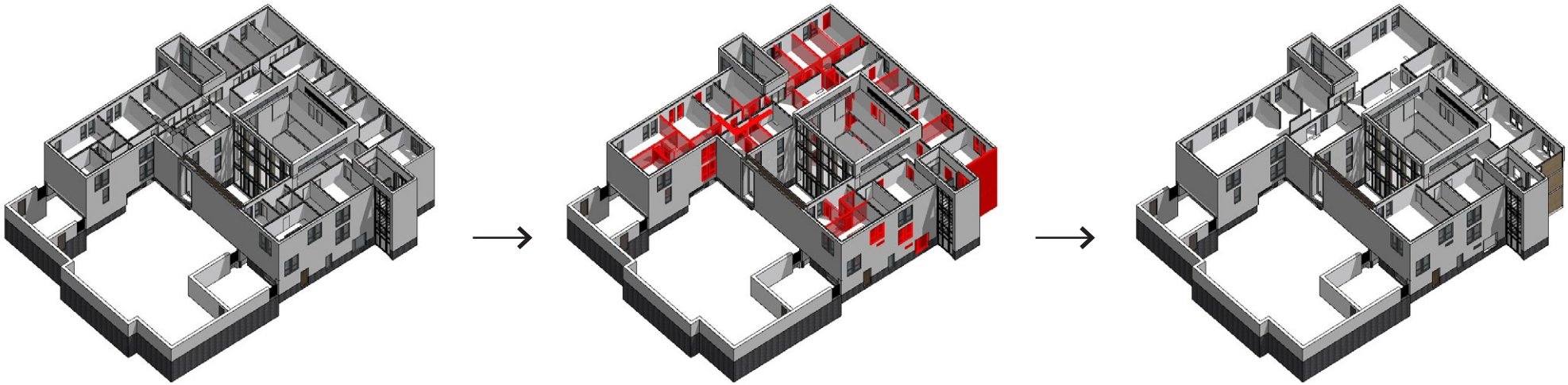
The building cannot be simply re-occupied as a school use due to the needs of the pupils, teaching staff, parents and the broader requirements of the DfE and BB104 for school standards. The change of use requires reasonably extensive refurbishment works. However, the team has adhered to the primary principle of trying to retain existing 'layers' of the building as much as possible.



Approach to Existing Building

GLA Decision Tree Fig.4

2.2 Key Decisions



Existing Building - Pre-Redevelopment Audit Undertaken

The project seeks to retain as mch of the existing building fabric on site as part of the re-purposing of the residential building to a new special school use.

As a residential building, the small cellular bedrooms do not provide the larger classrooms and support spaces required by BB104 standards (see Appendix A - Pre-Redevelopment Audit)

Key Materials and Elements Identified

To ensure that the standards can be achieved, internal structural and non-structural walls need to be removed and internal finishes, fittings and services reconfigured to suit the spatial planning.

The Pre-demolition audit (Appendix B) lists materials to be removed to facilitate the re-purposing of the building.

100% Building Re-Purposed for School Use

The existing fabric of the existing building is largely retained. The building is refurbished with new finishes, services and fittings to allow occupation of the building for a sustainable community use as a special school.

2.3 Approach to Extension

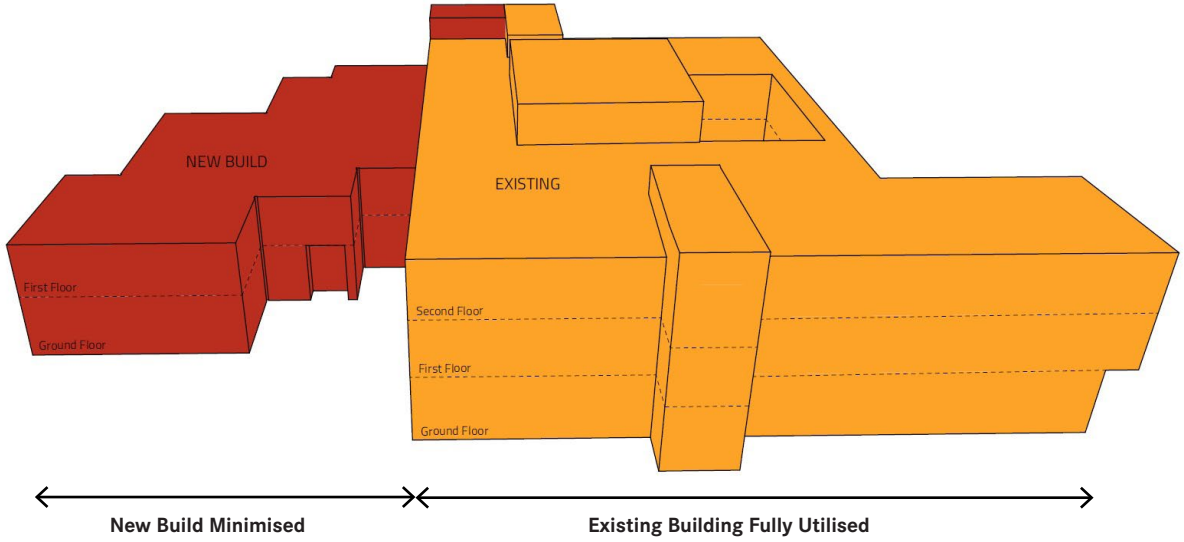
New-Build Extension

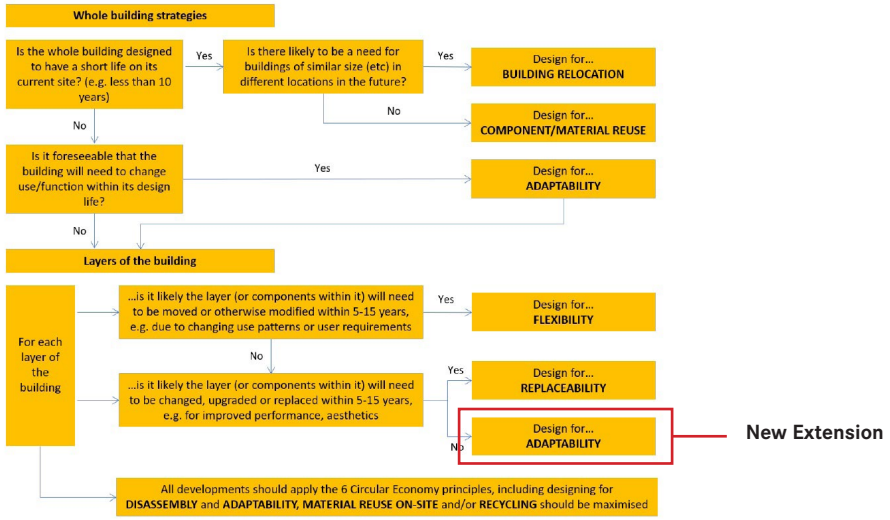
The existing building comprises approximately 1613m2 GIA. However, BB104 standards suggest a building size larger than this for a special school of 90 pupils with MLD/ SLD needs.

A new extension is proposed to the existing building which increases the overall school size to oapprox 2235m2 GIA.

Forming space within the new-build element is more resource-hungry than the existing building and therefore the extension has been designed to be spatially efficient to minimise its size whilst maximizing the re-use of the existing building. In this way, the project REDUCES new materials in line with waste hierachy principles.

Using the decision tree within GLA guidance, the layers of the building are to be designed for ADAPTABILITY and DISASSEMBLY for re-use or recycling at the end-of-life.





GLA Decision Tree Fig.5

2.4 Circular Economy Principles

Building Layers

The design team has adopted the GLA recommendation of structuring the CES to consider the building in 'layers' that approximately correspond to RICS building categories.

The CE Principles have been included within the CES Spreadsheet and are also summarised in the following pages. These Principles structure how different layers of the building should be addressed to meet the strategic approach and at construction, in-use, and end-of-life stages.

It will be the responsibility of the contractor and its team to adopt these principles and outline how the measures will be addressed in its design and construction phases.

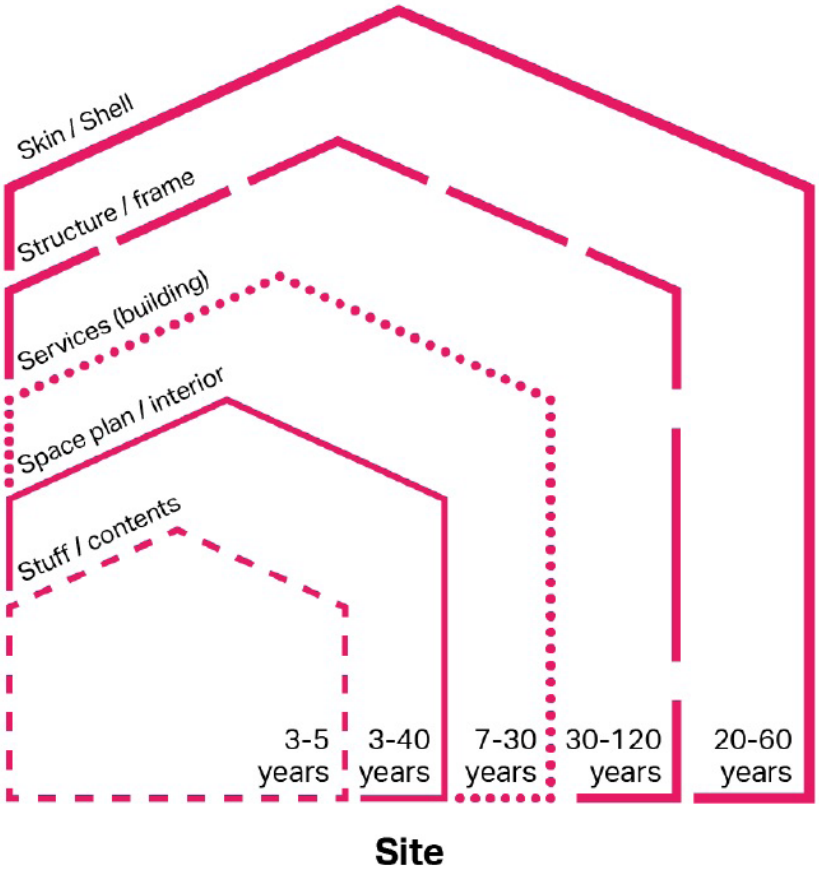
The principles also apply after the end of the contractor's operations, and so the CES will need to be communicated and understood by building owners and managers through to the end of life. Please refer to section 2.8 - Implementation.

Project Team Coordination

Key members of the design team have met to review the WLC and CES requirements of the project in a Teams meeting dated 20th June 2022. This included:

CDC Studio - responsible for architectural design and coordinating WLC and CES statements
Edward Pearce - responsible for MEP services design
Michael Hadi Associates - responsible for Structural/ Civil design

The teeam has collectively quantified tonnages of materials and excavations, as well as calculated operational carbon emissions. Principles by layer were reviewed, as well as End of Life scenarios and re-use of materials. These were discussed to tailor Oneclick LCA software to enable the preparation of the CES.



2.4 Circular Economy Principles

	Site	Sub-Structure	Super-Structure	Skin	Services	Space	Stuff	Construction	Summary	Challenges	Actions	Planning
A - Construction Conserve Resources	Repurposing of site for long-term community use. Existing sub-bases to external areas and metal MUGA fencing partially re-used.	Lightweight superstructure reduces concrete and excavation volumes. Concrete grades optimised with use of 50% GGBS as cement replacement.	CLT superstructure proposed for new extension is low weight and offers benefits of sequestered carbon. Prefabricated panels and swift low-resource erection reduces on-site waste.	Existing insulated render systems good thermal performance, proposed to be retained and repaired/ re-coated. Existing windows and doors largely retained/ refurbished.	Existing sevices will not suit the change of use to a special school and will be removed for recycling. New high-efficiency services including ASHP replacing gas for longevity of plant. Water efficient fittings to be specified.	Partitions amd floors/ ceilings removed for recycling to alter small cellular room sizes towards larger school use rooms for flexibility. 100% of existing building spaces re-purposed with extension required to meet BB104 space requirements.	Existing fixtures 11 years old and tending to end-of life/ recycling of timber-based products. Sanitaryware unsuitable for school use - to be reclaimed for re-use.	Contractor compound size to provide space for on-site waste stream separation and reduce waste to landfill.	Retention of existing building structure and fabric reduces minimises new materials and resources whilst meeting spatial requirements.	Cost and programme impacts. Spatial limitations of existing building.	Design and Build Contractor to develop CE assessments. Use BRE Smartwaste tools (or similar) through construction phase to record waste-streams and quantities. Responsible sourcing of materials to accredited schemes.	Early contractor supply chain engagement. Developed strategy during 2nd Stage Tender/ Contractor proposals. Detailed condition survey of proposed retained elements at 2nd Stage tender.
B - In-Use Reduce Waste	Car parking designed to allow flexibility should parking need reduce. Infrastructure for electric charging into be established. Adequate refuse storage provided.	-	Openings in CLT tobe infilled with removable partitions to allow for future adaptions. CLT to be designed with capacity in structure for future ceiling-mounted hoists/ equipment.	Render finishes to allow ease of repair and recoating to avoid replacement. Good practice in construction details to ensure low-maintenance facades and roofs.	Water distribution allows for ease of replacement of discrete heaters without large works. Good quality LED lighting reduces replacement.	Rooms sized to BB104 standards for flexibility of room layouts. External areas designed for replacement/ reconfiguration of equipment.	Robust finishes/ interior materials to fixed FFE for longevity. Standardisation of components. Allowance for dissassembly of components for replacements of parts.	Rooftop services considered in Access & Maintenance strategy for ease of replacement without impact on adjacent elements.	Standardise components and design for robustness. Flexibility in services distribution.	Embedding principles of standardisation and durability in supply chain. Embedding good workmanship in construction.	Contractor/ Employers Agent to review procurement strategies and information submitted in second stage tender.	Contractor Proposals to explicitly outline procedures for resilience and durability. All parties to develop Access and Maintenance strategy.
C - End-of-Life Manage Waste	Plan for disassassembly of fencing, play equipment, site furniture, gates	Lightweight superstructure reduces excavation and underpinning. Optimise drainage design to reduce below-ground attenuation and exccavation.	Pre-demolition audit identifies key materials and related end-of-life strategies. All waste streams to be managed on-site by contractor to maintain CE targets.					Contractor to plan deliveries and packaging with supply chain to reduce site collection/ management.	95% diversion from landfill required as GLA policy SI7	Materials with high reuseability/ recyclability to be sourced and backed up with accredited certification (eg Cradle to Cradle)	Ensure adequate contractor resource, space and time to work to site management recommendations. Provide information of strategy for long-term review.	Contractor SWMP to be developed and waste monitored using BRE Smartwaste tools or similar. Undertake further ground contamination surveys.

2.4 Circular Economy Principles

	Site	Sub-Structure	Super-Structure	Skin	Services	Space	Stuff	Construction	Summary	Challenges	Actions	Planning
Designing for Longevity	Site currently unused. Building to be repurposed for long-term community use.	Rectification of below-ground drain system following detailed CCTV survey. Increasing rainwater attenutation to consider climate change impacts.	CLT low-carbon biogenic solution. Existing CLT and glulam re-used and re-lined for protection.	Robust brick cladding. Render finishes to be repaired and re-coated for extended life. Ballasted/ green roof protects roof membrane for extended life.	Gas removed as heating source for future-proofing energy source. New internal services to modern standards and warranty for long-term use.	New sprinkler system protects building for extended life period.	Partitions all double-boarded for robustness. School use requires robust and easily maintainable finishes. All low-level glazing to be protected/ toughened & laminated.	Robust details to be used as guidance to shell detailing - good practice to be adopted.	Longevity key consideration in school use. Attention to robust detailing and specification required	Establishing robustness within project cost planning due to capital impacts. Quality management of sub-contractors and suppliers.	Employers Agent to consider Clerk of Work duties. Contractor to establish ISO9001 Quality Management procedures.	Projeect Preliminaries to clearly establish roles and quality expectations.
Designing for Adaptability	Proposed ne vehicle access will provide independence of access to the building. Building also intended to be restored to residential use if required.	-	CLT to be designed to allow to expact new limited openings/ services penetrations. Limitations to be recorded in H&S file.	Brick cladding allows for installation of new services or brise-soleils depending on future need for climate change.	Distribution runs/ risers designed for future capacity. Roof-mounted ASHP in discrete units that can be singularly replaced whilst others continue to run.	New 13 person lift provides access for larger wheelchairs enabling upper rooms to be used by all pupils.	Standardised components that can be swapped between rooms and purchased as standard items.	Industry-standard specification of all components to enable multiple points of engagement with the construction market.	Special school use means flexibility in access and use is key as pupil's needs can change year-on-year.	Accessibility for all pupils and allowing spaces and services to flex to facilitate all anticipateed needs.	Use of BS8300 as guiding principle behind all space planning and component design to ensure high levels of accessibility and safety.	Contractor to embed accessibility reviews with key stakeholders in design and build activities
Designing for Disassembly	Attenuation tank modular for ease of removal from site.	New extension sub-structure to be discrete from existing building to allow for removal without disturbing stability of larger block.	CLT contractor to design for reversal of erection sequence during design phase.	Composite windows and brickwork to be taken down/ stripped away fromsuper-structure	Local water heaters can be easily removed/ relocated to suit WC/ sink reconfiguration. Services containment to allow removal/ addition of new.	New extension to be structurally separate to main building to allow future removal should building revert back to residential use.	Finishes dry-lined rather than wet trades to enable ease of separation. FFE framing/ carcasses to be demountable.	Design for layer independence to allow for ease of replacement or removal without disturbance to other elements. Avoid the use of adhesives.	General principle to allow the extension to be removable and existing building to be cellularised to revert back to residential use in the future.	CLT is load-bearing and difficult to remove for local asaptions.	Design extension structure and services to allow removal. Design CLT frame to minimise load-bearing internal walls.	Contractor supply chain to confirm disassembly of components at point of tender.
Elements for Re-Use/ Recycle	External play equipment	Concrete from sub-structure could be crushed for re-use on site to fill attenuation trenches	CLT panels and steelwork all easily reclaimed for re-use or recycleing.	Consider lime-based mortar to brickwork to facilitate brickwork reclaim.	Electrical cabling and pipework metals stripped out for recycling.	-	FFE furniture can be re-used, as well as standard-sized doors	Site Waste Management Plan to be developed by contractor.	95% target for all materials to be reused or recycled.	Specifying materials that can be easily separated and recycled to a high value.	Use of BRE 'Green Guide to Materials' as aid to specification.	Develop CE statement principles during design and build process.

2.5 Bill of Materials

Please refer to GLA formatted spreadsheet for expanded column content

Encouraging Re-Use

Designing for benefits beyound the system boundary (Module D) is difficult to predict due to the nature of the timesales involved. However, there are certain items which could be available for direct re-use at the End of Life, some of which are highlighted here;

Brickwork
lime-based mortars would encourage the separation of mortar from bricks for reclamation.

CLT
The EoL suggests that timber is incinerated for energy production, but all panels are individually demountable and opportunities could exist for re-use in other projects.

Sanitaryware
Individual elements of sanitaryware - subject to condition - could be isolated and re-used off-site.

	BUILDING ELEMENT CATEGORY - LEVEL 1 (based on the RICS New Rules of Measurement (NRM) classification system level 2 sub-elements https://www.rics.org/globalassets/rics-website/media/products/data-products/bcis-construction/bcis-elemental-standard-form-cost-analysis-4th-nrm-edition-2012.pdf)				PRODUCT AND CONSTRUCTION STAGE (MODULE A)		END OF LIFE STAGE (MODULE C)				
	Building Element Category	Material Type	Material quantity (Module A) (kg)	Material intensity (Module A) (kg/m² GIA)	Performance Indicator (LPG Appendix 1)	Construction Waste Factor (Module A)	Design for Disassembly	Assumed End of Life Scenario (Description)	% Reusing	% Recycling	% Landfill
1	**Substructure**	-	**547,080**	**245**	Building Element Category 1, 2nd Quartile	-	-	-	-	-	-
1	Substructure	Ready-mix concrete, RC 32/40 (32/40 MPa), with	174,870	78	-	0	No	e (for sub-base layers)	0%	95%	5%
1	Substructure	Reinforcement steel (rebar), generic, 97% recycle	12,500	6	-	0	No	Steel recycling	0%	95%	5%
1	Substructure	Shape moulded EPS insulation for inverted flat ro	280	0	-	0	No	c-based material incine	0%	95%	5%
1	Substructure	CEM I, Ordinary Portland Cement (OPC)	42,330	19	-	0	No	nent/mortar use in a ba	0%	95%	5%
1	Substructure	Ready-mix concrete, RC 32/40 (32/40 MPa), with	315,810	141	-	0	No	e (for sub-base layers)	0%	95%	5%
1	Substructure	PIR insulation boards, aluminium foil faced, <= 18	1,290	1	-	0	No	c-based material incine	0%	95%	5%
2.1	**Superstructure: Frame**	-	**242,971**	**109**	Building Element Category 2.1, 2nd Quartile	-	-	-	0%	95%	5%
2.1	Superstructure: Frame	Ready-mix concrete, RC 32/40 (32/40 MPa), with	160,030	72	-	0	No	e (for sub-base layers)	0%	95%	5%
2.1	Superstructure: Frame	Reinforcement steel (rebar), generic, 97% recycle	9,180	4	-	0	No	Steel recycling	0%	95%	5%
2.1	Superstructure: Frame	Steel, hot-dip galvanized steel	2,140	1	-	0	No	Steel recycling	0%	95%	5%
2.1	Superstructure: Frame	Structural steel profiles, generic, 90% recycled co	2,980	1	-	0	Yes	Steel recycling	0%	95%	5%
2.1	Superstructure: Frame	Structural steel profiles, generic, 90% recycled co	18,390	8	-	0	Yes	Steel recycling	5%	90%	5%
2.1	Superstructure: Frame	Timber - Average of all data	21	0	-	0	Yes	Wood incineration	0%	95%	5%
2.1	Superstructure: Frame	Timber, CLT	3,550	2	-	0	Yes	Wood incineration	0%	95%	5%
2.1	Superstructure: Frame	Timber, Glulam	840	0	-	0	Yes	Wood incineration	0%	95%	5%
2.1	Superstructure: Frame	Steel sheets, generic, 90% recycled content (typ	200	0	-	0	Yes	Steel recycling	0%	95%	5%
2.1	Superstructure: Frame	Steel sheets, generic, 90% recycled content (typ	730	0	-	0	Yes	Steel recycling	0%	95%	5%
2.1	Superstructure: Frame	Ready-mix concrete, RC 32/40 (32/40 MPa), with	220	0	-	0	Yes	e (for sub-base layers)	0%	95%	5%
2.1	Superstructure: Frame	Ready-mix concrete, RC 32/40 (32/40 MPa), with	580	0	-	0	Yes	e (for sub-base layers)	0%	95%	5%
2.1	Superstructure: Frame	Steel, hot-dip galvanized steel	670	0	-	0	Yes	Steel recycling	0%	95%	5%
2.1	Superstructure: Frame	Timber, CLT	43,090	19	-	0	Yes	Wood incineration	0%	95%	5%
2.1	Superstructure: Frame	Timber, Glulam	350	0	-	0	Yes	Wood incineration	0%	95%	5%
2.2	**Superstructure: Upper Floors**	-	**39,716**	**18**	Building Element Category 2.2, 1st Quartile	-	-	-	0%	95%	5%
2.2	Superstructure: Upper Floors	Timber, Chipboard	0	0	-	0	Yes	Wood incineration	0%	95%	5%
2.2	Superstructure: Upper Floors	Gypsum plasterboard, tapered or square edges,	3,540	2	-	0	Yes	Gypsum recycling	0%	95%	5%
2.2	Superstructure: Upper Floors	PIR (polyisocyanurate foam) insulation panels, un	380	0	-	0	Yes	c-based material incine	0%	95%	5%
2.2	Superstructure: Upper Floors	Rock wool insulation, unfaced, R = 1 m2K/W, Lan	580	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
2.2	Superstructure: Upper Floors	Steel, hot-dip galvanized steel	530	0	-	0	Yes	Steel recycling	0%	95%	5%
2.2	Superstructure: Upper Floors	Timber, CLT	33,790	15	-	0	Yes	Wood incineration	0%	95%	5%
2.2	Superstructure: Upper Floors	Timber, Glulam	910	0	-	0	Yes	Wood incineration	0%	95%	5%
2.3	**Superstructure: Roof**	-	**30,710**	**14**	Building Element Category 2.3, 1st Quartile	-	-	-	18%	77%	5%
2.3	Superstructure: Roof	Particleboard, 660 kg/m3 (Norbord)	210	0	-	0	Yes	Wood incineration	0%	95%	5%
2.3	Superstructure: Roof	PIR insulation boards, aluminium foil faced, <= 18	1,680	1	-	0	Yes	c-based material incine	0%	95%	5%
2.3	Superstructure: Roof	Rock wool insulation, unfaced, R = 1 m2K/W, Lan	310	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
2.3	Superstructure: Roof	Soil, loose dry density, 1220 kg/m3	27,300	12	-	0	Yes	ndfilling (for inert materi	20%	75%	5%
2.3	Superstructure: Roof	Waterproofing membrane, single component, cold	240	0	-	0	Yes	c-based material incine	0%	95%	5%
2.3	Superstructure: Roof	Structural sawn timber, kiln dried, planed or machi	970	0	-	0	Yes	Wood incineration	0%	95%	5%
2.4	**Superstructure: Stairs and Ramps**	-	**2,790**	**1**	-	-	-	-	0%	90%	10%
2.4	Superstructure: Stairs and Ramps	Timber, CLT	2,500	1	-	0	Yes	Wood incineration	0%	95%	5%
2.4	Superstructure: Stairs and Ramps	Resilient linoleum floor covering, 3.5mm, 3 kg/m2,	290	0	-	0	Yes	Material reclamation	0%	50%	50%
2.5	**Superstructure: External Walls**	-	**352,540**	**158**	Building Element Category 2.5 & 2.6, 3rd Quartile	-	-	-	4%	91%	5%
2.5	Superstructure: External Walls	Timber, CLT	45,280	20	-	0	Yes	Wood incineration	0%	95%	5%
2.5	Superstructure: External Walls	Gypsum plasterboard, tapered or square edges,	5,500	2	-	0	Yes	Gypsum recycling	0%	95%	5%
2.5	Superstructure: External Walls	Mineral rendering and plastering mortar for walls,	1,710	1	-	0	Yes	nent/mortar use in a ba	0%	95%	5%
2.5	Superstructure: External Walls	Plywood for wall application, spruce, 12 mm, 6 kg	70	0	-	0	Yes	Wood incineration	0%	95%	5%
2.5	Superstructure: External Walls	Concrete block wall, with medium density solid blo	31,190	14	-	0	Yes	e (for sub-base layers)	0%	95%	5%
2.5	Superstructure: External Walls	PIR insulation boards, aluminium foil faced, <= 18	2,520	1	-	0	Yes	c-based material incine	0%	95%	5%
2.5	Superstructure: External Walls	Ready-mix concrete, normal-strength, generic, C2	192,000	86	-	0	Yes	e (for sub-base layers)	0%	95%	5%
2.5	Superstructure: External Walls	Rock wool insulation, unfaced, R = 1 m2K/W, Lan	440	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
2.5	Superstructure: External Walls	Single skin wall from bricks, including mortar, with	71,180	32	-	0	Yes	shed to aggregate (for b	20%	75%	5%
2.5	Superstructure: External Walls	Structural sawn timber, kiln dried, planed or machi	490	0	-	0	Yes	Wood incineration	0%	95%	5%
2.5	Superstructure: External Walls	Structural sawn timber, kiln dried, planed or machi	2,160	1	-	0	Yes	Wood incineration	0%	95%	5%
2.6	**Superstructure: Windows and External Doors**	-	**6,898**	**3**	Building Element Category 2.5 & 2.6, 3rd Quartile	-	-	-	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Manual interior roller blind, 4.83 kg/m2 (Grouperne	600	0	-	0	Yes	ining product recycling	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Float glass, single pane, generic, 3-12 mm (0.12-(	1,300	1	-	0	Yes	Glass recycling	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Float glass, single pane, generic, 3-12 mm (0.12-(	1,300	1	-	0	Yes	Glass recycling	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Float glass, single pane, generic, 3-12 mm (0.12-(	1,300	1	-	0	Yes	Glass recycling	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Aluminium profile for windows and doors, 2600 kg/	58	0	-	0	Yes	Aluminium recycling	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Wooden decking, cladding and planed timber for s	810	0	-	0	Yes	Wood incineration	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Wooden decking, cladding and planed timber for s	780	0	-	0	Yes	Wood incineration	0%	95%	5%
2.6	Superstructure: Windows and External Doors	Wood-aluminium inward patio door, 2+1-glass, pe	750	0	-	0	Yes	ining product recycling	0%	95%	5%
2.7	**Superstructure: Internal Walls and Partitions**	-	**31,330**	**14**	Building Element Category 2.7 & 2.8, 2nd Quartile	-	-	-	0%	95%	5%
2.7	Superstructure: Internal Walls and Partitions	Gypsum plasterboard, tapered or square edges,	24,350	11	-	0	Yes	Gypsum recycling	0%	95%	5%
2.7	Superstructure: Internal Walls and Partitions	Metal framing components for gypsum plasterboa	6,980	3	-	0	Yes	Steel recycling	0%	95%	5%
2.8	**Superstructure: Internal Doors**	-	**16,020**	**7**	Building Element Category 2.7 & 2.8, 2nd Quartile	-	-	-	0%	95%	5%
2.8	Superstructure: Internal Doors	Wooden and engineered wood interior doors, 1,2	16,020	7	-	0	Yes	ining product incineratio	0%	95%	5%
3	**Finishes**	-	**26,048**	**12**	-	-	-	-	0%	95%	5%
3	Finishes	Carpet floor covering (thickness 0.006 m)), 6 mm,	18	0	-	0	Yes	c-based material incine	0%	95%	5%
3	Finishes	Carpet tiles, 6.4 mm, 4.085 kg/m2, Tessera Chror	3,240	1	-	0	Yes	c-based material incine	0%	95%	5%
3	Finishes	Resilient linoleum floor covering, 3.5mm, 3 kg/m2,	3,390	1	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
3	Finishes	Gypsum plasterboard tiles for ceiling application,	3,020	1	-	0	Yes	Gypsum recycling	0%	95%	5%
3	Finishes	Gypsum plasterboard, tapered or square edges,	9,140	4	-	0	Yes	Gypsum recycling	0%	95%	5%
3	Finishes	Acoustic cement-bonded wood wool panel, unpain	1,870	1	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
3	Finishes	Mineral ceiling tiles, L=0.06 W/mK, 17 mm, 4.5 kg	340	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
3	Finishes	Metal framing components for gypsum plasterboa	5,230	2	-	0	Yes	Steel recycling	0%	95%	5%
4	**Fittings, furnishings & equipment (FFE)**	-	**790**	**0**	-	-	-	-	4%	14%	81%
4	Fittings, furnishings & equipment (FFE)	Acrylic washbasin, faucets not included, 16.4 kg/u	330	0	-	0	Yes	ndfilling (for inert materi	5%	0%	95%
4	Fittings, furnishings & equipment (FFE)	Stainless steel sink, 5.97 kg/unit, DONNEE PAR U	120	0	-	0	Yes	Metal Recycling	0%	95%	5%
4	Fittings, furnishings & equipment (FFE)	Suspended ceramic toilet pack (with mechanism a	340	0	-	0	Yes	ndfilling (for inert materi	5%	0%	95%
5	**Services (MEP)**	-	**15,019**	**7**	-	-	-	-	0%	95%	5%
5	Services (MEP)	4-port water brass manifolds, 0.7 kg/unit, DONNE	13	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
5	Services (MEP)	Pipes for water distribution network, 0.1116 kg/m,	470	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	PVC pipes for drinking water network, 18.5 kg/m (	1,230	1	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Aluminium air intake vent, 200 x 200 mm, 0.04 m2	110	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Circular duct fan R-100, galvanized steel (RUUKK	26	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Cold water storage tank, 81.77 kg/unit, DONNEE	410	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Air handling unit, with heat recovery through plate	2,510	1	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Electric water heater (water cylinder), per unit, 13	3,160	1	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Interior LED projector, P= 14 à 36 W., DONNEE P	510	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
5	Services (MEP)	Circulating pump, 250-1000W/unit	180	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	ELECTRIC VEHICLE CHARGING STATION, EVF;	250	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Intrusion detector, 0.048 kg/unit, 6412301/MDO-1	8	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Single and three phase distribution boards, 14.7 k	240	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Air-to-air heat pump, external unit, heating (25.9 k	1,210	1	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Cable sleeve, 0.165 kg/m, diameter: 32-40 mm, C	210	0	-	0	Yes	c-based material incine	0%	95%	5%
5	Services (MEP)	Enclosure cabinet for electrical equipment, 115.9	230	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Solar panel photovoltaic system, EU average	1,020	0	-	0	Yes	ining product recycling	0%	95%	5%
5	Services (MEP)	Copper cable, 0.05 kg/m, Panduit NK6A™ Categ	1,030	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
5	Services (MEP)	Hot dip galvanized steel, 0.73 mm, 5.72 kg/m2	1,880	1	-	0	Yes	Steel recycling	0%	95%	5%
5	Services (MEP)	Rock wool insulation, unfaced, R = 1 m2K/W, Lan	320	0	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
6	**Prefabricated Buildings and Building Units**	-	**0**	**0**	-	-	-	-	0%	0%	100%
7	**Work to Existing Building**	-	**193,050**	**86**	-	-	-	-	0%	95%	5%
7	Work to Existing Building	Float glass, single pane, generic, 3-12 mm (0.12-(	1,500	1	-	0	Yes	Glass recycling	0%	95%	5%
7	Work to Existing Building	Float glass, single pane, generic, 3-12 mm (0.12-(	1,500	1	-	0	Yes	Glass recycling	0%	95%	5%
7	Work to Existing Building	Carpet tiles, 5.1mm, 3.765 kg/m2, TESSERA STR	21,030	9	-	0	Yes	c-based material incine	0%	95%	5%
7	Work to Existing Building	Ceramic toilet, 19.6 kg/unit, - DURAVIT - Starck 3	3,140	1	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
7	Work to Existing Building	Drinking water supply piping network, per m2 GIFA	420	0	-	0	Yes	ining product recycling	0%	95%	5%
7	Work to Existing Building	Glass, Toughened, per kg	2,400	1	-	0	Yes	Glass recycling	0%	95%	5%
7	Work to Existing Building	Gypsum plasterboard, 12.5 mm, 8.985 kg/m2 (ave	5,600	2	-	0	Yes	Gypsum recycling	0%	95%	5%
7	Work to Existing Building	Gypsum plasterboard, 12.5 mm, 8.985 kg/m2 (ave	62,100	28	-	0	Yes	Gypsum recycling	0%	95%	5%
7	Work to Existing Building	Heat distribution system (water heat distribution)	4,880	2	-	0	Yes	ining product recycling	0%	95%	5%
7	Work to Existing Building	Rendering mortar – normal / finishing render, 1550	3,200	1	-	0	Yes	nent/mortar use in a ba	0%	95%	5%
7	Work to Existing Building	Rock wool/mineral wool insulation, L = 0.035-0.0	12,090	5	-	0	Yes	ndfilling (for inert materi	0%	95%	5%
7	Work to Existing Building	Sewage water drainage piping network, per m2 G	300	0	-	0	Yes	ining product recycling	0%	95%	5%
7	Work to Existing Building	Timber, Chipboard	2,700	1	-	0	Yes	Wood incineration	0%	95%	5%
7	Work to Existing Building	Ventilation system for residential building, per m2	1,010	0	-	0	Yes	ining product recycling	0%	95%	5%
7	Work to Existing Building	Waterproofing membrane, single component, cold	1,980	1	-	0	Yes	c-based material incine	0%	95%	5%
7	Work to Existing Building	Wooden and engineered wood interior doors, bloc	21,870	10	-	0	Yes	ining product incineratio	0%	95%	5%
7	Work to Existing Building	Hot dip galvanized steel, 0.73 mm, 5.72 kg/m2	190	0	-	0	Yes	Steel recycling	0%	95%	5%
7	Work to Existing Building	Hot-dip galvanized structural steel, 7850 kg/m3 (to	380	0	-	0	Yes	Steel recycling	0%	95%	5%
7	Work to Existing Building	Timber, CLT	46,160	21	-	0	Yes	Wood incineration	0%	95%	5%
7	Work to Existing Building	Wooden decking, cladding and planed timber for s	800	0	-	0	Yes	Wood incineration	0%	95%	5%
8	**External works**	-	**899,140**	**402**	-	-	-	-	0%	7%	93%
8	External works	Aggregates and sand, expanded clay, bulk, loose	200,000	89	-	0	No	ndfilling (for inert materi	0%	5%	95%
8	External works	High density polyethylene (HDPE) plastic pipe, 0%	770	0	-	0	No	c-based material incine	0%	95%	5%
8	External works	High density polyethylene (HDPE) plastic pipe, 0%	11,880	5	-	0	No	c-based material incine	0%	95%	5%
8	External works	Aggregate (crushed gravel), generic, dry bulk den	675,000	302	-	0	No	ndfilling (for inert materi	0%	5%	95%
8	External works	Concrete manhole, Dia = 1000 mm, H = 1.80 m, L	1,950	1	-	0	No	erated (2 %), concrete w	0%	95%	5%
8	External works	Concrete manhole, Dia = 1000 mm, H = 1.80 m, C	4,910	2	-	0	No	erated (2 %), concrete w	0%	95%	5%
8	External works	Manhole access cover, Carriageway (PAM)	730	0	-	0	No	Steel recycling	0%	95%	5%
8	External works	Reinforcement steel (rebar), generic, 97% recycle	3,900	2	-	0	No	Steel recycling	0%	95%	5%
	Overall		2,404,102	1,076					1%	61%	38%

2.6 End of Life Strategy

Enabling a Circular Economy

LETI notes that a key requirement of a circular economy is that we *"recover and regenerate products and materials at the end of each service life."*

The End-of Life management of the materials and components of the project is therefore vitally important to retain their value to future projects.

Derived from the Bill of Materials - and coordinating with the Whole Life Carbon Assessment for this project - the adjacent table indicates materials within the project and their likely End-of-Life scenario based upon current technologies. Possibilities for re-use of materials from the proposed enabling strip-out of the existing building are indicated in the Pre-Demolition Audit (Appendix B).

Communication of End of Life Strategy

During detailed design and construction of the project the contractor will be required to develop the principles of this Circular Economy Statement and action and measure the recommendations. This will be embedded in the building contract and by planning condition.

The developed CES and relevant supporting tion (eg BIM modelling, drawings, specifications) will be included in the project health and safety file to be stored electronically by building managers and the client the London Borough of Hillingdon in an agreed format.

Specified materials and components should be accompanied by EPD or 'Cradle-to-Cradle' certifications collated within the H&S File. This should also include manufacturer information and installation details where applicable. A schedule of manufacturer take-back schemes should also be included.

RICS category	Material Type	Material Quantity (Module A) (kg)	Design for Disassembly	Assumed End of Life Scenario (Description)
0.3.Temporary Supports to Adjacent S	Structural steel profiles, generic, 90% recycled co	1000.00 kg	Yes	Steel recycling
1.1.1.Standard foundations	Ready-mix concrete, RC 32/40 (32/40 MPa), with	174870.00 kg	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3
1.1.1.Standard foundations	Reinforcement steel (rebar), generic, 97% recycle	12500.00 kg	No	Steel recycling
1.1.1.Standard foundations	Shape moulded EPS insulation for inverted flat ro	280.00 kg	No	Plastic-based material incineration
1.1.3.Lowest floor construction	CEM I, Ordinary Portland Cement (OPC)	42330.00 kg	No	Cement/mortar use in a backfill
1.1.3.Lowest floor construction	Ready-mix concrete, RC 32/40 (32/40 MPa), with	315810.00 kg	No	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3
1.1.3.Lowest floor construction	PIR insulation boards, aluminium foil faced, <= 16	1290.00 kg	Yes	Plastic-based material incineration
2.1. Frame	Ready-mix concrete, RC 32/40 (32/40 MPa), with	160030.00 kg	Yes	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3
2.1. Frame	Reinforcement steel (rebar), generic, 97% recycle	9180.00 kg	Yes	Steel recycling
2.1. Frame	Steel, hot-dip galvanized steel	2140.00 kg	Yes	Steel recycling
2.1. Frame	Structural steel profiles, generic, 90% recycled co	2980.00 kg	Yes	Steel recycling
2.1. Frame	Structural steel profiles, generic, 90% recycled co	18390.00 kg	Yes	Steel recycling
2.1. Frame	Timber - Average of all data	21.00 kg	Yes	Wood incineration
2.1. Frame	Timber, CLT	3550.00 kg	Yes	Wood incineration
2.1. Frame	Timber, Glulam	840.00 kg	Yes	Wood incineration
2.1.1.Steel frames	Steel sheets, generic, 90% recycled content (typic	200.00 kg	Yes	Steel recycling
2.1.1.Steel frames	Steel sheets, generic, 90% recycled content (typic	730.00 kg	Yes	Steel recycling
2.1.4.Concrete frames	Ready-mix concrete, RC 32/40 (32/40 MPa), with	220.00 kg	Yes	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3
2.1.4.Concrete frames	Ready-mix concrete, RC 32/40 (32/40 MPa), with	580.00 kg	Yes	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3
2.1.5.Timber frames	Steel, hot-dip galvanized steel	670.00 kg	Yes	Steel recycling
2.1.5.Timber frames	Timber, CLT	43090.00 kg	Yes	Wood incineration
2.1.5.Timber frames	Timber, Glulam	350.00 kg	Yes	Wood incineration
2.2.1.Floors	Timber, Chipboard	5.90 kg	Yes	Wood incineration
2.2.1.Floors	Gypsum plasterboard, tapered or square edges,	3540.00 kg	Yes	Gypsum recycling
2.2.1.Floors	PIR (polyisocyanurate foam) insulation panels, ur	380.00 kg	Yes	Plastic-based material incineration
2.2.1.Floors	Rock wool insulation, unfaced, R = 1 m2K/W, Lam	560.00 kg	Yes	Landfilling (for inert materials)
2.2.1.Floors	Steel, hot-dip galvanized steel	530.00 kg	Yes	Steel recycling
2.2.1.Floors	Timber, CLT	33790.00 kg	Yes	Wood incineration
2.2.1.Floors	Timber, Glulam	910.00 kg	Yes	Wood incineration
2.3.1.Roof structure	Particleboard, 660 kg/m3 (Norbord)	210.00 kg	Yes	Wood incineration
2.3.1.Roof structure	PIR insulation boards, aluminium foil faced, <= 16	1680.00 kg	Yes	Plastic-based material incineration
2.3.1.Roof structure	Rock wool insulation, unfaced, R = 1 m2K/W, Lam	310.00 kg	Yes	Landfilling (for inert materials)
2.3.1.Roof structure	Soil, loose dry density, 1220 kg/m3	27300.00 kg	Yes	
2.3.2.Roof coverings	Waterproofing membrane, single component, co	240.00 kg	No	Plastic-based material incineration
2.3.Roofs	Structural sawn timber, kiln dried, planed or mac	970.00 kg	Yes	Wood incineration
2.4.1.Stair and ramp structures	Timber, CLT	2500.00 kg	Yes	Wood incineration
2.4.2.Stair and ramp finishes	Resilient linoleum floor covering, 3.5mm, 3 kg/m2	290.00 kg	Yes	Landfilling (for inert materials)
2.5.1.External enclosing walls above gr	Timber, CLT	45280.00 kg	Yes	Wood incineration
2.5.External walls	Gypsum plasterboard, tapered or square edges,	5500.00 kg	Yes	Gypsum recycling
2.5.External walls	Mineral rendering and plastering mortar for wall	1710.00 kg	Yes	Cement/mortar use in a backfill
2.5.External walls	Plywood for wall application, spruce, 12 mm, 6 kg	70.00 kg	Yes	Wood incineration
2.5.External walls	Concrete block wall, with medium density solid b	31190.00 kg	Yes	Concrete crushed to aggregate (for sub-base layers), Portland Cement 200 kg / m3
2.5.External walls	PIR insulation boards, aluminium foil faced, <= 16	2520.00 kg	Yes	Plastic-based material incineration
2.5.External walls	Ready-mix concrete, normal-strength, generic, C2	192000.00 kg	Yes	Concrete crushed to aggregate (for sub-base layers), Portland Cement 300 kg / m3
2.5.External walls	Rock wool insulation, unfaced, R = 1 m2K/W, Lam	440.00 kg	Yes	Landfilling (for inert materials)
2.5.External walls	Single skin wall from bricks, including mortar, wit	71180.00 kg	Yes	Brick/stone crushed to aggregate (for sub-base layers)
2.5.External walls	Structural sawn timber, kiln dried, planed or mac	490.00 kg	Yes	Wood incineration
2.5.External walls	Structural sawn timber, kiln dried, planed or mac	2160.00 kg	Yes	Wood incineration
2.6.1.External Windows	Manual interior roller blind, 4.63 kg/m2 (Groupe	600.00 kg	Yes	Metal-containing product recycling (90 % metal)
2.6.1.External Windows	Float glass, single pane, generic, 3-12 mm (0.12-0	1300.00 kg	Yes	Glass recycling
2.6.1.External Windows	Float glass, single pane, generic, 3-12 mm (0.12-0	1300.00 kg	Yes	Glass recycling
2.6.1.External Windows	Float glass, single pane, generic, 3-12 mm (0.12-0	1300.00 kg	Yes	Glass recycling
2.6.1.External Windows	Aluminum profile for windows and doors, 2600 k	58.00 kg	Yes	Aluminium recycling
2.6.1.External Windows	Wooden decking, cladding and planed timber for	810.00 kg	Yes	Wood incineration
2.6.1.External Windows	Wooden decking, cladding and planed timber for	780.00 kg	Yes	Wood incineration
2.6.2.External doors	Wood-aluminium inward patio door, 2+1-glass, p	750.00 kg	Yes	Glass-containing product recycling (80 % glass)
2.7.1.Walls and Partitions	Gypsum plasterboard, tapered or square edges,	24350.00 kg	Yes	Gypsum recycling
2.7.1.Walls and Partitions	Metal framing components for gypsum plasterbo	6980.00 kg	Yes	Steel recycling
2.8.Internal doors	Wooden and engineered wood interior doors, 1,2	16020.00 kg	Yes	Wood-containing product incineration (80% wood)
3.2.Floor finishes	Carpet floor covering (thickness 0.006 m)), 6 mm	18.00 kg	Yes	Plastic-based material incineration
3.2.Floor finishes	Carpet tiles, 6.4 mm, 4.065 kg/m2, Tessera Chror	3240.00 kg	Yes	Plastic-based material incineration
3.2.Floor finishes	Resilient linoleum floor covering, 3.5mm, 3 kg/m2	3390.00 kg	Yes	Landfilling (for inert materials)
3.3.1.Finishes to ceilings	Gypsum plasterboard tiles for ceiling application,	3020.00 kg	Yes	Gypsum recycling
3.3.1.Finishes to ceilings	Gypsum plasterboard, tapered or square edges,	9140.00 kg	Yes	Gypsum recycling
3.3.1.Finishes to ceilings	Acoustic cement-bonded wood wool panel, unpa	1670.00 kg	Yes	Landfilling (for inert materials)
3.3.1.Finishes to ceilings	Mineral ceiling tiles, L=0.06 W/mK, 17 mm, 4.5 kg	340.00 kg	Yes	Landfilling (for inert materials)
3.3.3.Demountable suspended ceilings	Metal framing components for gypsum plasterbo	5230.00 kg	Yes	Steel recycling

End of Life Scenarios (One Click LCA Output)

2.6 End of Life Strategy

Key Strategies:

End-of-Life Disassembly

The design approach for the project is for DISASSEMBLY and ADAPTION including the REFURBISHMENT of the existing building. Designing for disassembly will facilitate re-use and/ or ease of separation of materials for recycling at the end of the project's life.

The building is designed for a 60 year lifespan but which is likely to have a longer lifespan subject to effective maintenance. Components and materials within the building are expected to require replacement and maintenance in the course of the building's lifespan, and therefore it is important for these items are designed to be discrete from other components.

The following principles of disassembly apply:

- Standardise building components (eg internal doors, ceiling panels, floor finishes) to ensure ease of replacement and supply.
- Prefabrication (eg CLT superstructure) will allow reversible demounting at EoL
- Avoidance of adhesives and relience upon accessible mechanical fixings wherever possible
- Provision of accessible services and containment routes to allow alteration and removal of services without affecting internal linings of fixtures. Avoidance of 'building in' services generally.
- Use of robust/ durable materials which retain their value to the end of their design life wherever possible.
- Construction detailing to ensure materials can be demounted and separated withoout disturbance to other layers of the building to facilitate ease of maintenance and recycling.

RICS category	Material Type	Material Quantity (Module A) (kg)	Design for Disassembly	Assumed End of Life Scenario (Description)
4.1.1.General fittings, furnishings and	Acrylic washbasin, faucets not included, 16.4 kg/	330.00 kg	Yes	Landfilling (for inert materials)
4.1.1.General fittings, furnishings and	Stainless steel sink, 5.57 kg/unit, DONNEE PAR DE	120.00 kg	Yes	Landfilling (for inert materials)
4.1.1.General fittings, furnishings and	Suspended ceramic toilet pack (with mechanism	340.00 kg	Yes	Landfilling (for inert materials)
5.4.Water installations	4-port water brass manifolds, 0.7 kg/unit, DONNI	13.00 kg	Yes	Landfilling (for inert materials)
5.4.Water installations	Pipes for water distribution network, 0.1116 kg/r	470.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.4.Water installations	PVC drainage system per linear meter, DN=125m	440.00 kg	Yes	Landfilling (for inert materials)
5.4.Water installations	PVC pipes for drinking water network, 18.5 kg/m	790.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.4.Water installations	Sprinkler system, room area m2	2.70 kg	Yes	Landfilling (for inert materials)
5.6.Space heating and Airconditioning	Aluminium air intake vent, 200 x 200 mm, 0.04 m	110.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.6.Space heating and Airconditioning	Circular duct fan R-100, galvanized steel (RUUKKI	28.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.6.Space heating and Airconditioning	Cold water storage tank, 81.77 kg/unit, DONNEE	410.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.6.Space heating and Airconditioning	Air handling unit, with heat recovery through pla	2510.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.6.Space heating and Airconditioning	Electric water heater (water cylinder), per unit, 1	3160.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.3.Lighting installations	Interior LED projector, P= 14 à 30 W, DONNEE PA	510.00 kg	Yes	Landfilling (for inert materials)
5.8.Electrical installations	Smoke detector, French average, DONNEE PAR D	36.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	Cable outlets with cover, 0.058 kg/unit, Mécanisr	14.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	Circulating pump, 250-1000W/unit	180.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	ELECTRIC VEHICLE CHARGING STATION, EVF2S22I	250.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	Electrical control panel, DONNEE PAR DEFAUT (D	0.30 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	Intrusion detector, 0.048 kg/unit, 6412305-MDO	8.10 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	Single and three phase distribution boards, 14.7 l	240.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.8.Electrical installations	TV wall outlet, 0.149 kg/unit, 600353 : Prise TV R	64.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.Services	Air-to-air heat pump, external unit, heating (26.9	1210.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.Services	Cable sleeve, 0.165 kg/m, diameter: 32-40 mm, C	210.00 kg	Yes	Plastic-based material incineration
5.Services	Enclosure cabinet for electrical equipment, 115.9	230.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.Services	Solar panel photovoltaic system, EU average	1020.00 kg	Yes	Metal-containing product recycling (90 % metal)
5.Services	Copper data networking cable, 0.05 kg/m, Pandu	750.00 kg	Yes	Landfilling (for inert materials)
5.Services	High current cable, 0.252 kg/m, DONNEE PAR DE	280.00 kg	Yes	Landfilling (for inert materials)
5.Services	Hot dip galvanized steel, 0.73 mm, 5.72 kg/m2	1880.00 kg	Yes	Steel recycling
5.Services	Rock wool insulation, unfaced, R = 1 m2K/W, Lam	320.00 kg	Yes	Landfilling (for inert materials)
7.1.Minor demolition and alteration w	Float glass, single pane, generic, 3-12 mm (0.12-0	1500.00 kg	Yes	Glass recycling
7.1.Minor demolition and alteration w	Float glass, single pane, generic, 3-12 mm (0.12-0	1500.00 kg	Yes	Glass recycling
7.1.Minor demolition and alteration w	Carpet tiles, 5.1mm, 3.765 kg/m2, TESSERA STRU	21030.00 kg	Yes	Plastic-based material incineration
7.1.Minor demolition and alteration w	Ceramic toilet, 19.6 kg/unit, - DURAVIT : Starck 3	3140.00 kg	Yes	Landfilling (for inert materials)
7.1.Minor demolition and alteration w	Drinking water supply piping network, per m2 GI	420.00 kg	Yes	Metal-containing product recycling (90 % metal)
7.1.Minor demolition and alteration w	Glass, Toughened, per kg	2400.00 kg	Yes	Glass recycling
7.1.Minor demolition and alteration w	Gypsum plasterboard, 12.5 mm, 8.985 kg/m2 (av	5600.00 kg	Yes	Gypsum recycling
7.1.Minor demolition and alteration w	Gypsum plasterboard, 12.5 mm, 8.985 kg/m2 (av	62100.00 kg	Yes	Gypsum recycling
7.1.Minor demolition and alteration w	Heat distribution system (water heat distribution	4880.00 kg	Yes	Metal-containing product recycling (90 % metal)
7.1.Minor demolition and alteration w	Rendering mortar – normal / finishing render, 15	3200.00 kg	Yes	Cement/mortar use in a backfill
7.1.Minor demolition and alteration w	Rock wool/mineral wool insulation, L = 0.035-0.0	12090.00 kg	Yes	Landfilling (for inert materials)
7.1.Minor demolition and alteration w	Sewage water drainage piping network, per m2 G	300.00 kg	Yes	Metal-containing product recycling (90 % metal)
7.1.Minor demolition and alteration w	Timber, Chipboard	2700.00 kg	Yes	Wood incineration
7.1.Minor demolition and alteration w	Ventilation system for residential building, per m	1010.00 kg	Yes	Metal-containing product recycling (90 % metal)
7.1.Minor demolition and alteration w	Waterproofing membrane, single component, co	1980.00 kg	Yes	Plastic-based material incineration
7.1.Minor demolition and alteration w	Wooden and engineered wood interior doors, bio	21870.00 kg	Yes	Wood-containing product incineration (80% wood)
7.1.Minor demolition and alteration w	Aluminum profile for windows and doors, 2600 k	45.00 kg	Yes	Aluminium recycling
7.1.Minor demolition and alteration w	Hot dip galvanized steel, 0.73 mm, 5.72 kg/m2	190.00 kg	Yes	Steel recycling
7.1.Minor demolition and alteration w	Hot-dip galvanized structural steel, 7850 kg/m3 (	380.00 kg	Yes	Steel recycling
7.1.Minor demolition and alteration w	Timber, CLT	46160.00 kg	Yes	Wood incineration
7.1.Minor demolition and alteration w	Wooden decking, cladding and planed timber for	600.00 kg	Yes	Wood incineration
8.1.2.Preparatory groundworks	Aggregates and sand, expanded clay, bulk, loose	200000.00 kg	Yes	
8.2.1.Roads, paths and pavings	High density polyethylene (HDPE) plastic pipe, 0%	770.00 kg	Yes	Plastic-based material incineration
8.2.1.Roads, paths and pavings	High density polyethylene (HDPE) plastic pipe, 0%	11880.00 kg	Yes	Plastic-based material incineration
8.2.1.Roads, paths and pavings	Aggregate (crushed gravel), generic, dry bulk den	675000.00 kg	Yes	
8.2.1.Roads, paths and pavings	Concrete manhole, Dia = 1000 mm, H = 1.80 m, D	1950.00 kg	Yes	Rebar separated (2 %), concrete to aggregate
8.2.1.Roads, paths and pavings	Concrete manhole, Dia = 1000 mm, H = 1.80 m, D	4910.00 kg	Yes	Rebar separated (2 %), concrete to aggregate
8.2.1.Roads, paths and pavings	Manhole access cover, Carriageway (PAM)	730.00 kg	Yes	Steel recycling
8.2.1.Roads, paths and pavings	Reinforcement steel (rebar), generic, 97% recycle	3900.00 kg	Yes	Steel recycling

End of Life Scenarios - Continued (One Click LCA Output)

2.7 Waste Reduction Targets

GLA Policy

The London Plan 2021 has identified the need for London to adopt a more circular economy to reduce waste to landfill and encourage the lean use of resources and materials. Policy SI7 supports this with 6 key principles:

1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
2) encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products
3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026
4) meet or exceed the municipal waste recycling target of 65 per cent by 2030
5) meet or exceed the targets for each of the following waste and material streams:
a) construction and demolition – 95 per cent reuse/recycling/recovery
b) excavation – 95 per cent beneficial use164
6) design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

This policy is further supported by London Plan Guidance 'Crcular Economy Statements' published March 2022.

The adjacent table demonstrates how this project can align with the policy requirements and sets targets for the management of waste generated by the proposed works.

TYPE	QUANTITY tonnes	tonnes/m2	Re-Used On/ Off Site	Recycled On/ Off-Site	To Landfill	Other Disposal	Notes
Excavation Waste	1905	0.85	1%	94%	5%	-	Based upon MHA calculation Assumes inert material. Minimised by lighweight superstructure. SUDS attenuation to be optimised.
Demolition Waste	849.64	0.38	1.4%**	93.6%	5%	-	Refer to Appendix A - Pre-Demolition Audit
Construction Waste	335	0.15	0%	95%	5%	-	Contractor Site Waste Management Plan aim for betterment
	QUANTITY Annum						
Municipal Waste	143,195l * (37.23 tonnes)		-	65% target	35% target	-	Based upon school assessment of current waste - see section 1.09

** EWC code 20 03 01 for mixed municipal waste density conversion factor 0.26 assumed*

*** Based upon 12,100kg re-used material potential in Pre-Demolition Audit*

2.8 Implementation & Conclusions

Plans for Implementation

As the project progresses, there are a number of actions required from different project team members to develop the principles of this statement. These are outlined in the adjacent table.

Although a circular economy is centred on retaining the value of materials and resources, the retention of infomation and knowledge is also central to this process. Many of the adjacent recommendations are structured to preserve information through the design and construction phases to the project's end-of-life.

The structure of the H&S File will be critical in passing on information, and so this document will need early agreement as to its content and should not solely contain CDM health and safety information. This will require the input of the Principal Designer, project managers and contractors.

Conclusions

This statement has been structured in compliance with the GLA Circular Economy Statement Guidance to demonstrate compliance with Policy SI7 and support the planning application for the project submitted to the London Borough of Hillingdon.

The statement includes circular economy principles relating to the project indicating how the intent of the policy can be met and establishing next steps. The project seeks to retain as much of an existing building and its site as possible whilst repurposing the building from a residential boarding block to a special school, securing its long-term use.

This Circular Economy statement should be read in conjunction with documents submitted with the planning application, and particularly with the Whole Life Carbon Assessment. The GLA Excel-format spreadsheet has been submitted to the London Borough of Hllingdon in parallel with this written document.

Issue	Action
DEMOLITION WASTE MANAGEMENT	Employers Agent to embed Pre-Demolition Audit within building contract preliminaries for contractor to monitor waste streams and establish a Site Waste Management Plan prior to commencement of main contract works. Contractor Construction Phase Health and Safety Plan to indicate adequate site storage within contractor compound for separation of waste on-site and for vehicular collection. Contractor to approach local licensed waste contractors to ascertain capacity to receive waste for recycling and for items available for re-use (eg sanitaryware).
EXCAVATION WASTE MANAGEMENT	Contractor and design team to workshop opportunities for reducing excavation quantity at early next design stage by rationalising SUDS schemes and shared trenching of services. Contract specification to require contractor to investigate recycling of inert soils via specialist supplier and investigate capacity of local suppliers.
CONSTRUCTION WASTE MANAGEMENT	Contractor and design team to provide statement of intent for each building element within Access and Maintenance Strategy. Contractor to interrogate supply chain to explore pre-fabrication of components during second stage tender. Contractor and design team members to propose materials with cradle-to-cradle accreditations and EPD certificates indicating sustainable sources/ recyclable content and manufacturer take-back schemes. Submitted during second stage tender. Detailed circular economy statement to be included in building Health and Safety File information, including As-Built drawings, specifications and certificates outlining principles of maintenance, disassembly and re-use for ongoing maintenance purposes and for End-of-Life. Expected planning condition to be responsibility of Design & Build contractor and associated supply chain. Waste to be monitored on site by contractor using BRE Smartwaste or similar tracking software to prove GLA waste targets achieved or bettered (95% waste diverted from landfill). Contractor to prepare a Site Waste Management Plan that considers GLA "Mayor's Business Waste Management Strategy" and the general principles of the Site Waste Management Plans Regulations 2008.
OPERATIONAL WASTE MANAGEMENT	Design team/ contractor to ensure refuse stores are adequately sized and serviced. Post-handover, School building managers to separate waste streams (including food waste) and record volumes of waste produced to meet minimum 65% diversion from landfill. Annual monitoring report to be produced for submission to head teacher and governors. Teachers to instruct pupils regarding waste separation and storage.
RECYCLED CONTENT MANAGEMENT	Project specifications to require supplier EPD certificates during two-stage tender process demonstrating recycled content prior to selection of supplier. Contractor to collate all EPD certificates for handover to building managers in H&S file.

APPENDIX A Pre-Redevelopment Audit

A Pre-Redevelopment Audit

Background

Introduction

The London Borough of Hillingdon appointed CDC Studio to undertake a pre-redevelopment audit of the residential boarding block formerly known as Lord Adonis House and its adjacent site:

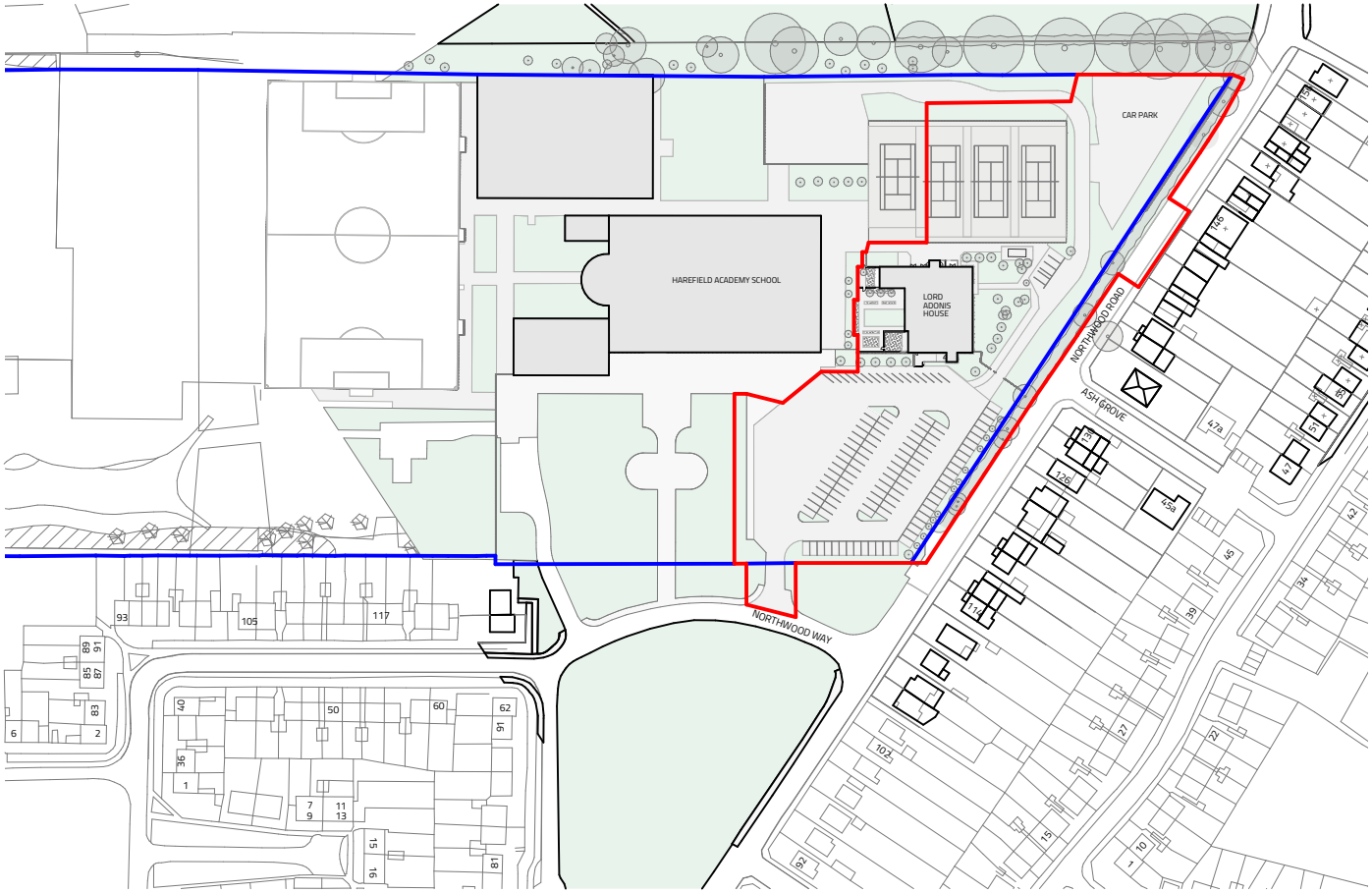
Lord Adonis House,
Northwood Way,
Harefield
Middlesex,
UB9 6ET

The site is to be repurposed to provide a new facility acting as an expansion of Meadow High School, Uxbridge. The facility is to provide as a special school for up to 90 pupils.

Purpose

An audit has been undertaken to establish the opportunities to establish a change of use from a residential use to a special school. The audit has included a measured survey and on-site investigations into the building fabric and service strategies, as well as the preparation of a BIM model to analyse spatial constraints.

Design options have been explored as explained in the Design and Access Statement. All design options have considered the retention of the building as a starting point, and no design options proposed the wholesale demolition of the existing building.



Site Plan (nts)

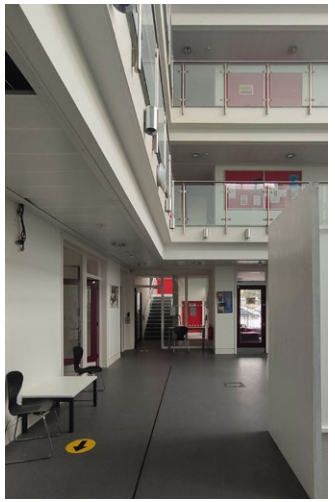
A Pre-Redevelopment Audit

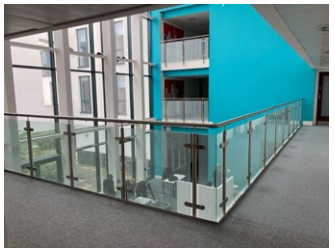
Development Potential

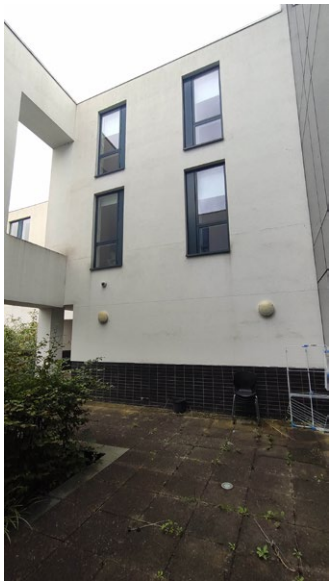
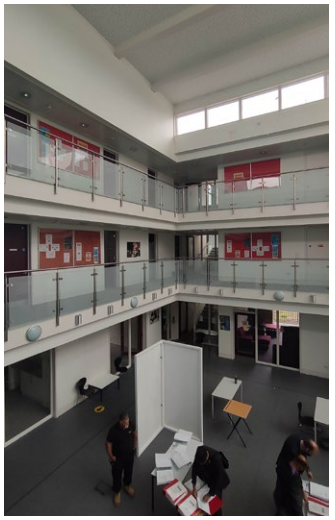
Existing Fabric and External Areas

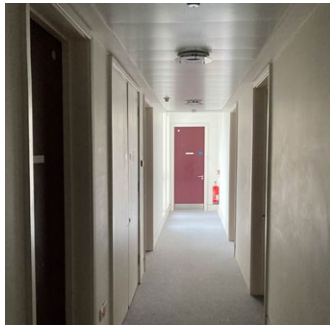
A visual condition survey has been undertaken to include structural and MEP investigations. This indicates that the existing building is in reasonable condition and the lifecycle of the building could be retained as 60 years subject to good maintenance and repair.

Existing Building - Photographs



Project Intent

The construction industry is challenged by organisations such as LETI, the RIBA, RICS, ISructE and the Architect's Journal to prioritise the re-use of buildings. This project is very much aligned with this intent.

A Pre-Redevelopment Audit

Analysis

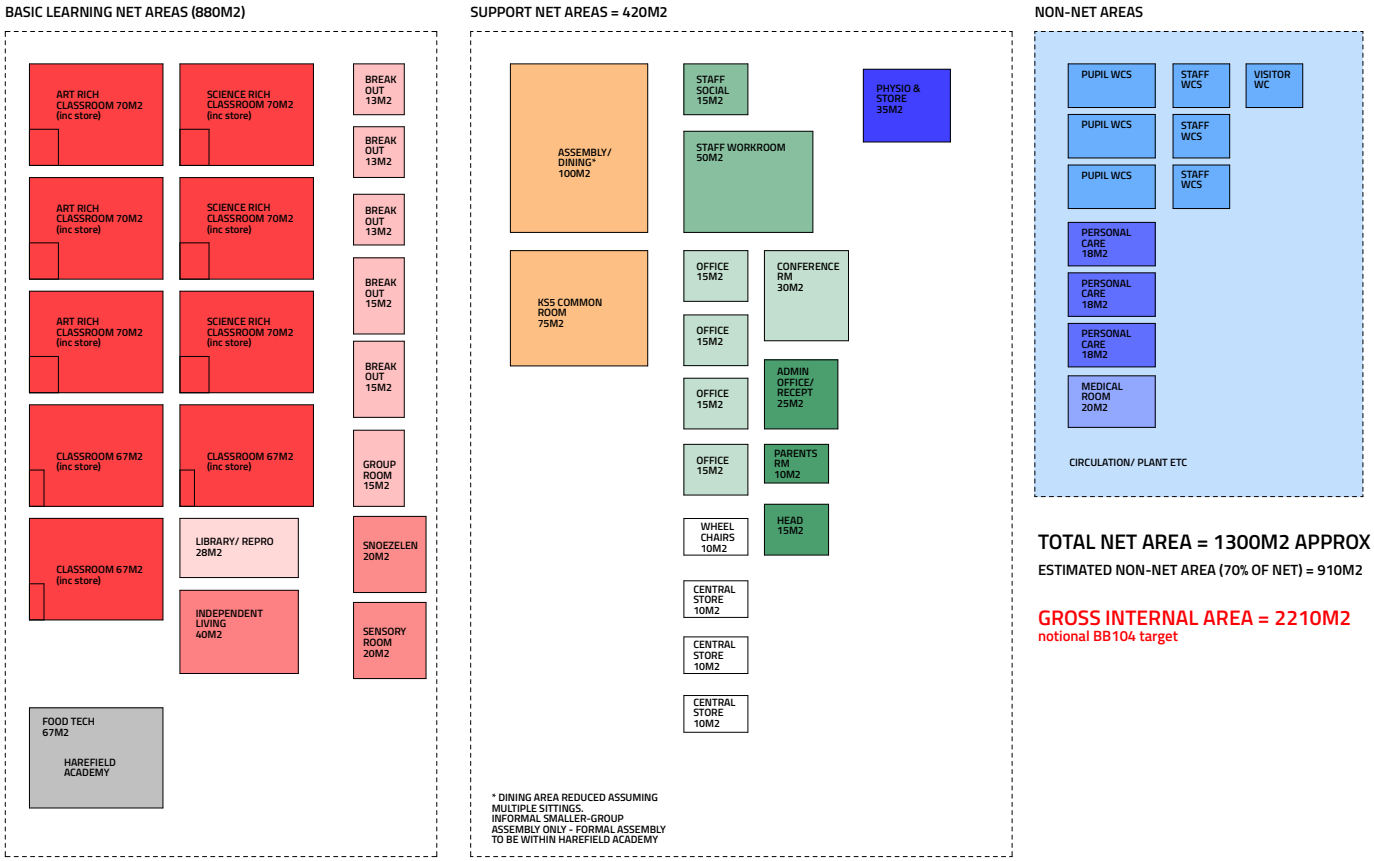
BB104 School Space Requirements

The space requirements of the school is guided by Department for Education specification including Building Bulletin 104, which covers space requirements for special schools.

At early design stages, the accommodation schedules suggested a gross area requirement of approximately 2200 - 2250m2, which is in excess of the GIA of the existing building (1613m2).

This meant that the existing building needed to be fully occupied as well as extended to meet the BB104 requirements.

Not all of the larger volume spaces could be accommodated in the extension, and so several large 10-pupil classroom spaces, for instance, needed to be sited in the existing building.



TOTAL NET AREA = 1300M2 APPROX

ESTIMATED NON-NET AREA (70% OF NET) = 910M2

GROSS INTERNAL AREA = 2210M2

notional BB104 target

A Pre-Redevelopment Audit

Retention of Building Elements

Existing Building Adaption

BB104-compliant classroom sizes demand rooms of approximately 64m2 in area. As a building originally constructed for residential use, the existing building contains many smaller, cellular bedroom spaces.

Therefore the early design stages of the work have been focussed on how to provide larger school spaces within the existing building whilst retaining as much of the building as possible. This is a spatial exercise which attempts to retain existing superstructure, finishes, fittings and services as much as possible whilst forming larger rooms suitable for a school use.

The adjacent diagram explains where larger rooms and accessible circulation affect the internal fabric. Largely, the external fabric (walls/ roofs/ windows/ doors) is retained except where ventilation strategies need to change to suit the DfE specification.

The spatial planning has allowed a pre-demolition audit to be undertaken to ascertain the quantum and type of material to be removed, along with recommendations for its re-use or recycling and its estimated carbon impact. Please refer to Appendix B.

Mitigation

The works will retain the key carbon-intensive latyers of the existing building, with a projected carbon saving of approx 440kgCO2e/m2. The new extension has its volume minimised to reduce new material being introduced to the site whilst creating the space needed by the brief. The new extension will be constructed to a high thermal performance to reduce the operational energy use of the whole site.

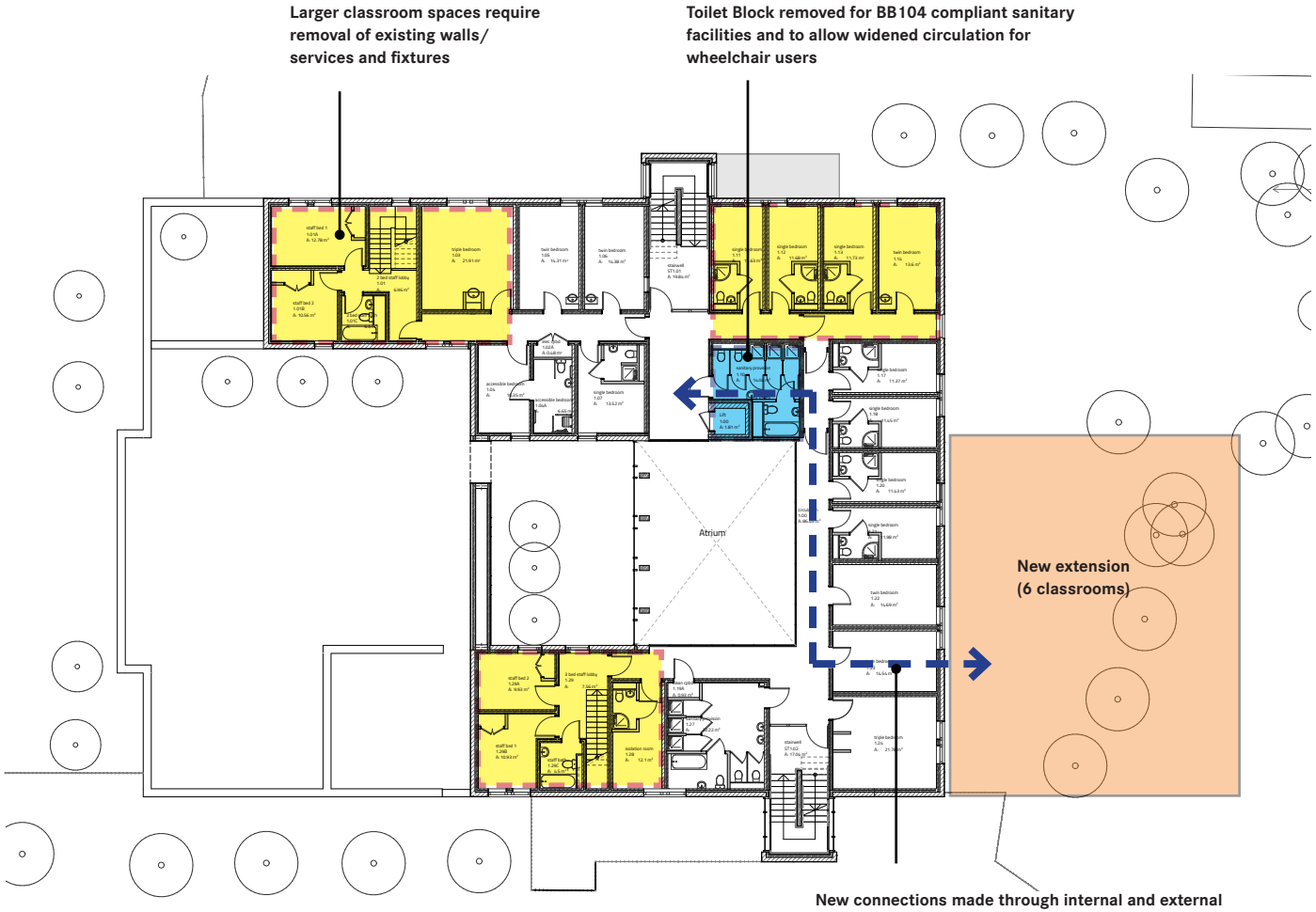


Diagram of Spatial Planning based upon Existing First Floor Plan

APPENDIX B Pre-Demolition Audit

B Pre-Demolition Audit

Overview

The Building

The site contains an existing 3-storey building constructed in 2011 to provide the function of a residential boarding block.

As a reasonably modern building, it has been designed to a good thermal performance and parts of the building remain in warranty.

The building is framed using Cross Laminated Timber on a concrete sub-structure. The external facades are principally comprised with a brick cladding plinth and an acrylic render over mineral wool insulation. The roofs comprise a PVC membrane on insulation acting as a warm roof. Windows and doors are aluminium and composite aluminium/ timber. A central atruim is glazed with aluminium-framed curtain walling to its full height.

Internally, load-bearing and non-loadbearing CLT walls are clad in plasterboard and conceal service runs. The building is served by an underfloor heating system running within a raised battened timber floor zone supporting mainly carpet finishes. Ceilings are metal/ gypsum demountable systems in circulation areas and plasterboard in bedrooms/ kitchens.

Internal timber doors with large vision panels and internal windows provide extensive levels of internal glazing, as does internal glass and steel balustrading to circulation routes around the atrium. Fixtures include built-in laminated HDC kitchens, wardrobe furniture, blinds and notice boards.

The building is serviced by gas boilers and an unused biomass boiler. Fire, power and data services are installed to reasonably modern standards. Public health and water services are extensive due to bedrooms having en-suite bathrooms, with associated sanitaryware.

Purpose

This document provides an overview and breakdown of the components and materials of the building and its site, as well as an appraisal of materials to be removed and how they can enter a circular economy.

Methodology

This document uses visual survey and photography information of the existing building and its site, along with investigation of 'As Built' information in the building's Health & Safety File. A detailed topographical and measured building survey has also been undertaken which has allowed the production of a detailed BIM model using Archicad and Revit software containing material descriptions.

This has enabled the take-off of material quantities which has been inputted into OneClick LCA Circular Economy software to output the metrics to the required GLA format.

Carbon Emissions

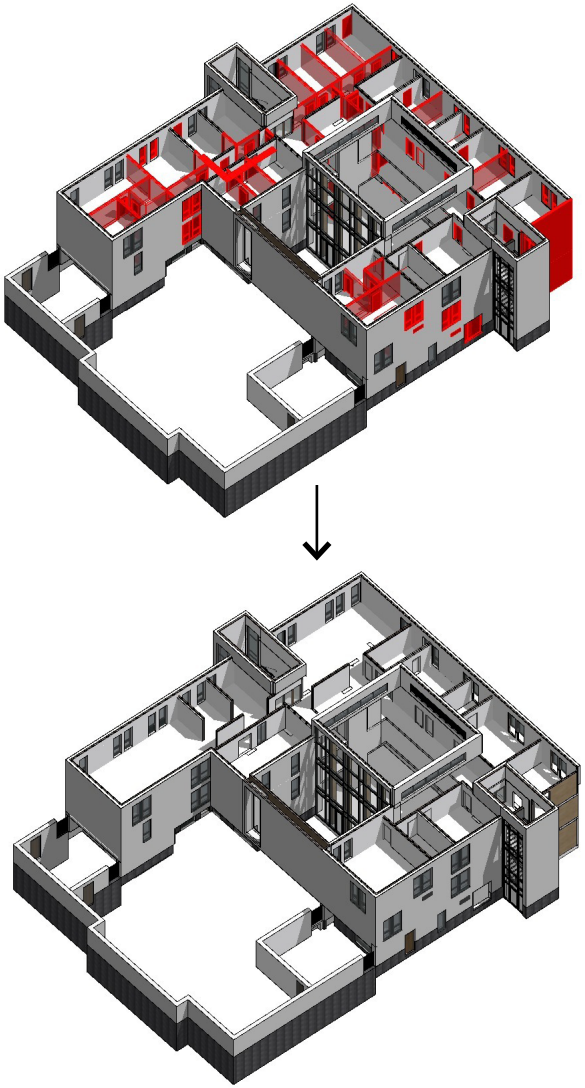
A Whole Life Carbon assessment has been undertaken for this project. and the following metrics have been assessed with regards to the retention and refurbishment of the existing building:

Embodied Carbon of Strip_out Materials = 159,142 kg/CO2e (including end of life processing - see below)

Embodied Carbon of Retained Fabric = 440 kg/CO2e/m2

Retaining the existing fabric is therefore demonstrated to provide an overall 983,000 kg/CO2e carbon saving in embodied energy.

Key Materials and Elements Identified in Pre-Demolition Audit



100% Building Re-Purposed for School Use

B Pre-Demolition Audit

Key Materials

Photographic Record

Visual site surveys have been undertaken by the project team and key materials relating to the proposed strip-out/ demolition works have been identified.

Brownfield Site

The existing building was only constructed in 2011, and in line with HSE guidance it is therefore not expected that asbestos-containing products will be present in the building.

However, the site is a brownfield site and used to contain a series of older school buildings prior to the construction of Harefield Academy. There remains the possibility that hazardous material could be buried, and therefore it is recommended that ground contamination testing should be undertaken prior to groundworks to prove inert material.

For the purposes of this Circular Economy Statement, it is assumed that all excavation is of inert material.


Composite Doors/ Windows


Insulated Render Cladding

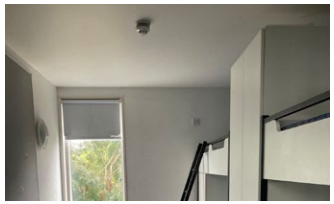

Single Ply Warm Roof


Cross Laminated Timber Structure


Internal Doors


Internal Services


Flooring/ Underfloor Heating


Plasterboard Ceilings/ Linings

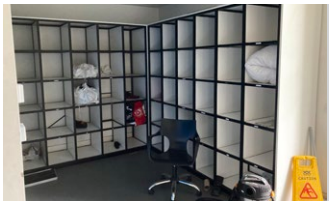

Gas Boilers/ Biomass


Sanitaryware


Fencing & Tarmacadam


Paving


Glass Balustrading


Fitted Furniture

B Pre-Demolition Audit

Strip-Out Materials

Quantities and Diversion from Landfill

The adjacent table indicates the estimated quantities and types of material expected to be removed from the existing building as part of the strip-out/ demolition phase, as well as the expected routes for control of waste. Quantities have been derived with the input of the project team and scheduling from CDC and MHA BIM models, which have assemblies and composite structures descibed in terms of their materials. Tonnages have been based upon material densities outlined in OneClick LCA software.

Materials will be separated on-site for processing for recycling where noted to maximise the retention of the material's value. Several opportunities exist to re-use materials on-site or off-site as outlined here. The table suggests re-used and recycled contents in alignment with GLA Policy SI7.

Opportunities for Re-Use

Subject to further detailed investigation, the following components have been identified to offer opportunites for on-site or off-site re-use. These options will need to be investigated and developed by the contractor during the second stage tender period. Further opportunities may exist:

1. On-site re-use of existing site fencing to enclose new MUGA
2. On-site re-use of CLT panels to form non-structural screens
3. On-site re-use of internal doors by Harefield Academy school
4. On-site re-use of ceiling panels
5. Off-site re-use of kitchen and wardrobe carcasses/ doors
6. Off-site re-use of sanitaryware including WC pans/ WH basins/ Sinks
7. On-site re-use of hard paving in new landscaping

Element	Materials	SWC Code	Reclaim	Quantity (t)	Re-Used	Recycled	Other Disposal	Notes
CLT Structure	Timber	17 02 01	Yes	49.7	1% on-site	99%	-	Only local removals for larger rooms sizes.
Single Ply Roof	Plastics	17 02 03	Yes	1.98	-	95%	5%	Roof retained to upper areas
Plasterboard Linings	Gypsum Metals	17 08 02 17 04 05	Yes	62.1	-	95%	5%	Gypsum recycled to approved scheme
Insulation/ Lagging	Mineral wool Foams	17 06 04 17 06 04	Partial	11.9	-	95%	5%	To services and internal partitions
External Render System	Mineral Wool Plastics	17 06 04 17 02 03	Partial	3.2	-	90%	10%	Removed locally at proposed extension interface
Glass Balustrading	Glass Metals	17 02 02 17 04 05	Yes	2.4	-	100%	-	Removed due to health and safety issues for special school use and for wheelchair access
Fitted Furniture	Timber Products Plastics	17 02 01 17 02 03	Yes	2.7	10% off-site	90%	-	Kitchen and wardrobe furniture capable of disassembly and reuse: target to be reviewed.
Sanitaryware	Ceramics	17 01 03	Yes	3.08	50% off-site			Sanitaryware approx 11 years old and capable of re-use
Ceiling Systems	Gypsum Metals	17 08 02 17 04 05	Yes	5.6	2% on-site	93%	5%	Gypsum and metal panels can be re-used.
Flooring	Textiles Plastics Timber Mineral Wool	20 01 11 17 02 03	Yes	21.03	1% on-site	95%	5%	Carpets and vinyls taken back by flooring manufacturer. Timber floor battens can be re-used for packers and concealed framing.
Internal Doors	Timber Products Glass	17 02 01 17 02 02	Yes	21.75	10% on-site	85%	5%	Re-use by Harefield Academy
Composite Windows	Aluminium Timber Glass Plastics	17 04 02 17 02 01 17 02 02 17 02 03	Yes	5	-	100%	-	Valfac window components designed for disassembly
External Fencing	Metals Timber	17 04 05 17 02 01	Yes	2.9	15% on-site	85%	-	Partial re-use of metal fencing to enclose new MUGA
Hard Surfacing	Conc. Paving Tarmacadam	17 01 01 17 03 02	Partial	633	1% on-site	94%	5%	Removal of access road surface, MUGA and adjacent paving
Green Waste	Soft Vegetation	20 02 01	Partial	3	3% on-site	97%	-	Existing trees can be replanted in some areas
Services	Metals Plastics	17 04 07 17 02 03	Partial	23.8	2% off-site	93&	5%	Biomass boiler is unused and capable of off-site re-use subject to demand
TOTAL DEMOLITION WASTE				**849.64 tonnes**				

B Pre-Demolition Audit

Waste Management

Waste Management in West London

The London Borough of Hillingdon is a member of the West London Waste Plan which establishes targets and procedures for managing waste in the borough.

The GLA has produced a waste map indicating waste magament facilities in the Greater London area which includes local service providers to the site in Harefield. The contractor should investigate suitable waste contractors for the waste streams identified in the bill of materials to ensure adequate capacity or demand exists for identified materials.

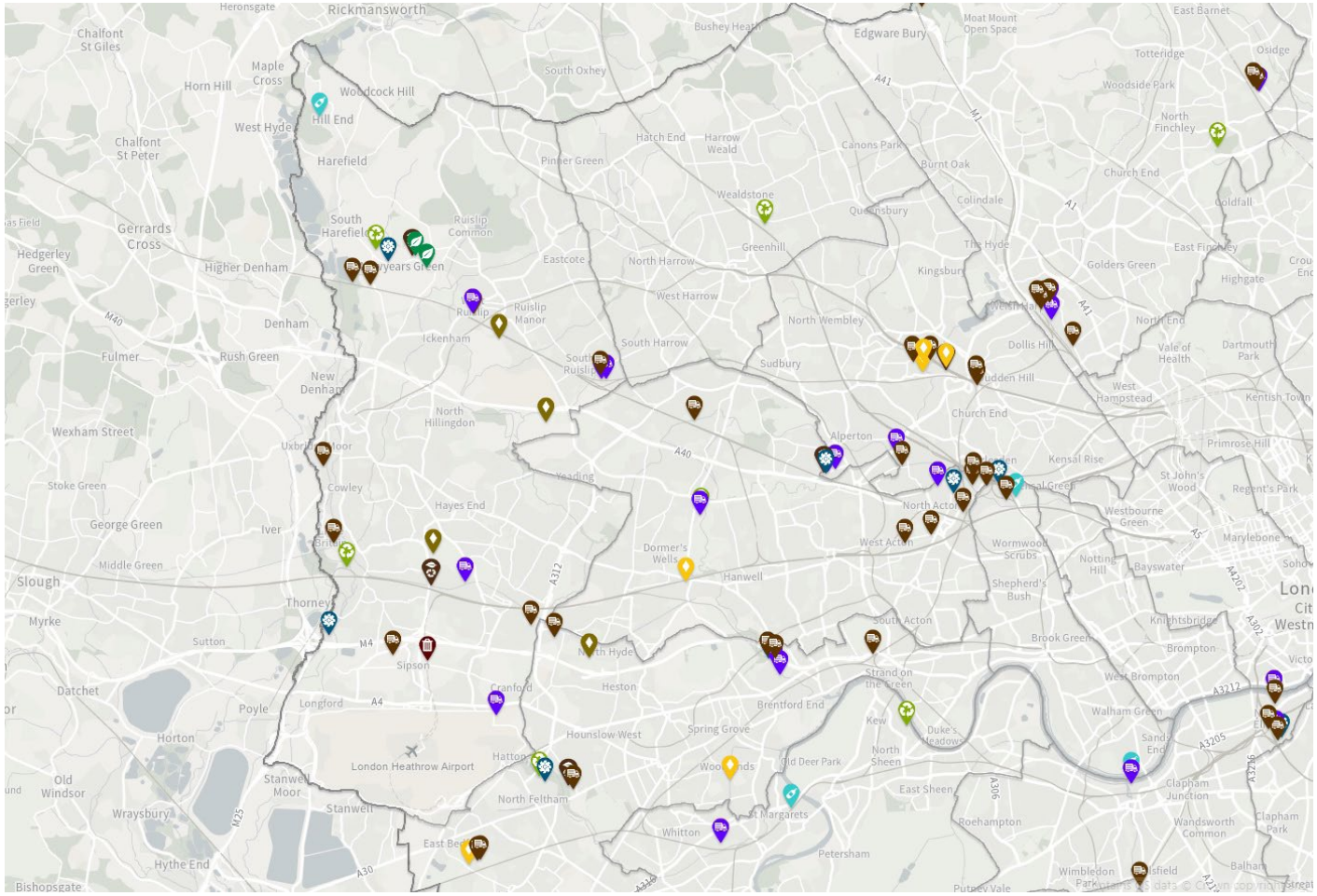
It is recommended that the design and build contractor use these documents to engage early on in its second stage tender process with licensed waste facilities to ascertain that the targets outlined in this Circular Economy Statement can be met and that markets exist for re-use and recycling where indicated.

Site Waste Management Planning

It is expected that a planning condition will be applied to the project to report against CE targets. The contractor will be obliged to maintain records of waste streams and volumes as well as origins/ destinations.

The site will accommodate space for a contractor compound to encourage on-site sorting and recording.

It is recommended that the contractor employ SWM quality control management - and the use of BRE Smartwaste tools or similar - to demonstrate compliance.



Extract from GLA London Waste Map showing Waste Facilities by Type

APPENDIX C Operational Waste Management

C Operational Waste Management

Waste Management Planning

In accordance with the waste hierachy, the operational waste strategy of the school is intended to avoid disposal to landfill of 65% in line with London Plan 2021 policy. Waste streams will be sorted on-site and separated for collection and recycling off-site.

This will be achieved by the following measures:

- Provision of internal bins within classrooms and at key points around the school to allow separation of dry reycling and general waste.

- Education and instruction by teachers to encourage pupils to separate waste and use bins effectively

- Daily collection of internal bins by cleaning staff and monitoring of waste into relevant external bins

- Preparation of a Operational Waste Management Plan by building manager and agreed/ shared with governors and staff.

- Assessment/ recording of waste volumes per waste stream at weekly point of collection by building manager

- Building manager to assess bin provision internally and externally to ensure units are operational and clean

- External bin enclosure to be provided with floor drain gulley to enable periodic wash-down/ disinfection

- Building manager to submit an operational waste report to head teacher and governors on an annual basis setting out how targets have been met or how improvements can be made.

- Low volumes of medical waste are expected. Management of medical waste to be agreed with medical staff in OWMP.

- Low volumes of geen/ vegetation waste are expected. To be agreed with Harefield Academy as part of their wider site management in OWMP.

Assessment of Waste Streams

The new facility will form an extension of Meadow High School, Uxbridge. The school currently maintains a school of 256 pupils.

The new facility will maintain a maximum of 90 pupils (with similar staff ratios), which is approximately 35% of the existing school roll. Taking a pro-rata approach to the production of waste - and assuming similar waste outputs between the two sites per pupil - the expected capacity is noted below:

	MHS Uxbridge	MHS Harefield*	Bin Storage
Waste to landfill	4400l weekly	1100l weekly	1 X 1100l Eurobin
Recycled Waste	8800l fortnightly	1547l weekly	2 X 1100l Eurobin
Food/ Green Waste	Not separated	500l weekly	660l Eurobin

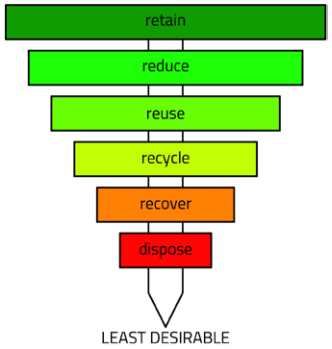
** Based upon Pro-Rata for student numbers*

This suggests at current rates approximately 51% diversion from landfill for school waste. However, in line with GLA targets a 65% diversion from landfill is required. To enable this, recycling capacity will be increased and storage provided for food waste to enable the 65% target to be achieved at this site.

Food Waste

Catering is expected to be transported to the site for warming and serving only. This means that food waste volumes at the site should be reasonably low given its preparation off-site.

Food waste is to be collected by catering managers/ staff for collection in external food waste receptacle. Catering managers to record waste quantities to refine food ordering and reduce production of waste. This information is to be shared with the building manager as part of their annual reporting.



Waste Hierachy

Classroom Bins showing separation of Dry Recycling

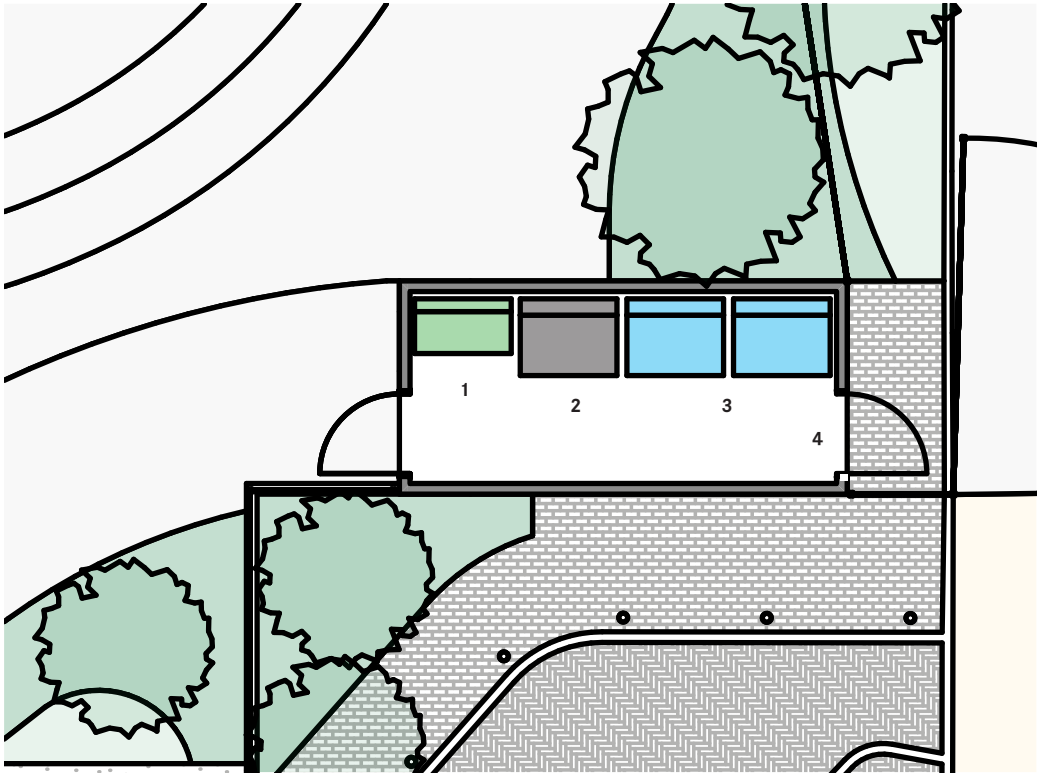
C Operational Waste Management

Refuse Infrastructure

The external bin enclosure is gated to both ends allowing ease of access for cleaners and during waste collection. The enclosure will be formed in timber to a height of 2.0m and provided with a floor gulley to enable wash-down of the area to maintain good hygiene.

The total area of the external bin enclosure is approximately 16m2. Adequate space exists for bins to be pulled into and out of the enclosure individually.

Gates are sized to provide min 1200mm clear opening to enable ease of access of Eurobin 1100 receptacles with flush paving finishes to the point of collection.



Plan of External Bin Enclosure

Key:

1	660l Eurobin	FOOD WASTE
2	1 X 1100l Eurobin	GENERAL WASTE Hard plastics, coffee cups, polystyrene, soiled packaging. sanitary products
3	2 x 1100l Eurobin	DRY RECYCLING Paper, Cardboard, Tetra Pak cartons, Glass bottles and jars, Steel and aluminium tins and cans, Tin foil, Plastic bottles, tubs, trays and bags
4	Lockable gate with min 1200mm clear width for bin access flush paving to collection vehicle point.	

Confidential paperwork is shredded and disposed of on an intermittent basis using private services.
Very low volumes of medical waste are disposed of using private services.

C Operational Waste Management

Waste Collection

An external bin store has been located adjacent to the vehicle access from Northwood Road to enable ease of collections and reduced pulling distances to house the bin store capacities noted above.

Refuse vehicle movements have ben considered to allow entry and exit into the site in a forward gear from the highway: please refer to Transport Statement.

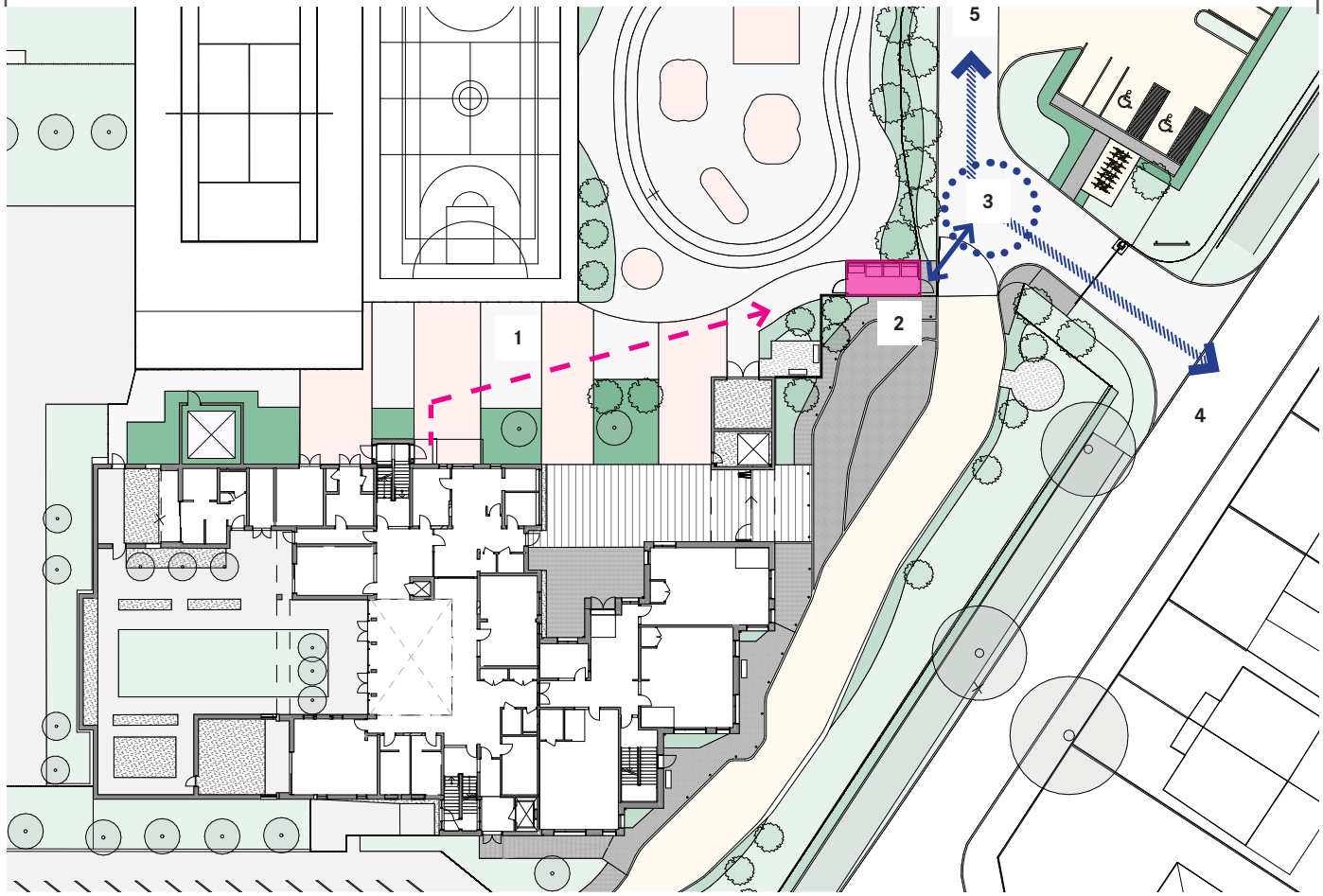
Opportunities for Consolidated Collection

It is anticipated that collections will be carried out by the London Borough of Hillingdon Waste Services on a weekly basis.

The new Meadow High School expansion is planned to operate as a distinct entity under the owenership of the London Borough of Hillingdon

The adjacent Harefield Academy currenly runs its own privately operated waste collection service. Opportunities exist for shared collections to be arranged between the two sites subject to agreement. All refuse vehicles accessing either this site or the Harefield Academy site will enter and exit from the Northwood Road access point.

It is anticipated that green vegetation waste from this site will be consolidated with Harefield Academy collection and storage/ composting.



Key:

1 Refuse Route
2 Secure Bin Store
3 Refuse Vehicle Collection Point
4 Vehicle Access to Northwood Road
5 Route of refuse vehicle to Harefield Academy collection point

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