

Avonmouth House, London Borough of Southwark
Life Cycle Carbon Assessment

25th October 2021

Prepared by: Matt Higgs

Contents

1 Introduction.....3

2 Policy3

2.1 The London Plan.....3

3 Methodology.....3

3.1 Product (A1 – A3).....4

3.2 Construction (A4 – A5).....4

3.3 Use (B1 – B7).....4

3.4 End of Life (C1-C4)5

3.5 Benefits and Loads Beyond the System Boundary (D)5

4 Results.....5

5 Actions.....5

5.1 Construction Materials5

5.2 Transportation to site6

5.3 Use6

5.4 Material replacement and refurbishment6

5.5 Energy use.....6

5.6 Water use.....6

5.7 Deconstruction6

6 Conclusion.....6

7 Appendix7

1 Introduction

This report summarises the whole life carbon assessment undertaken for the proposed development of Avonmouth House to meet the sustainability requirements of the London Plan.

The site is situated in the London Borough of Southwark. The proposed development consists of the demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure. The site area is shown in Figure 1-1 below.

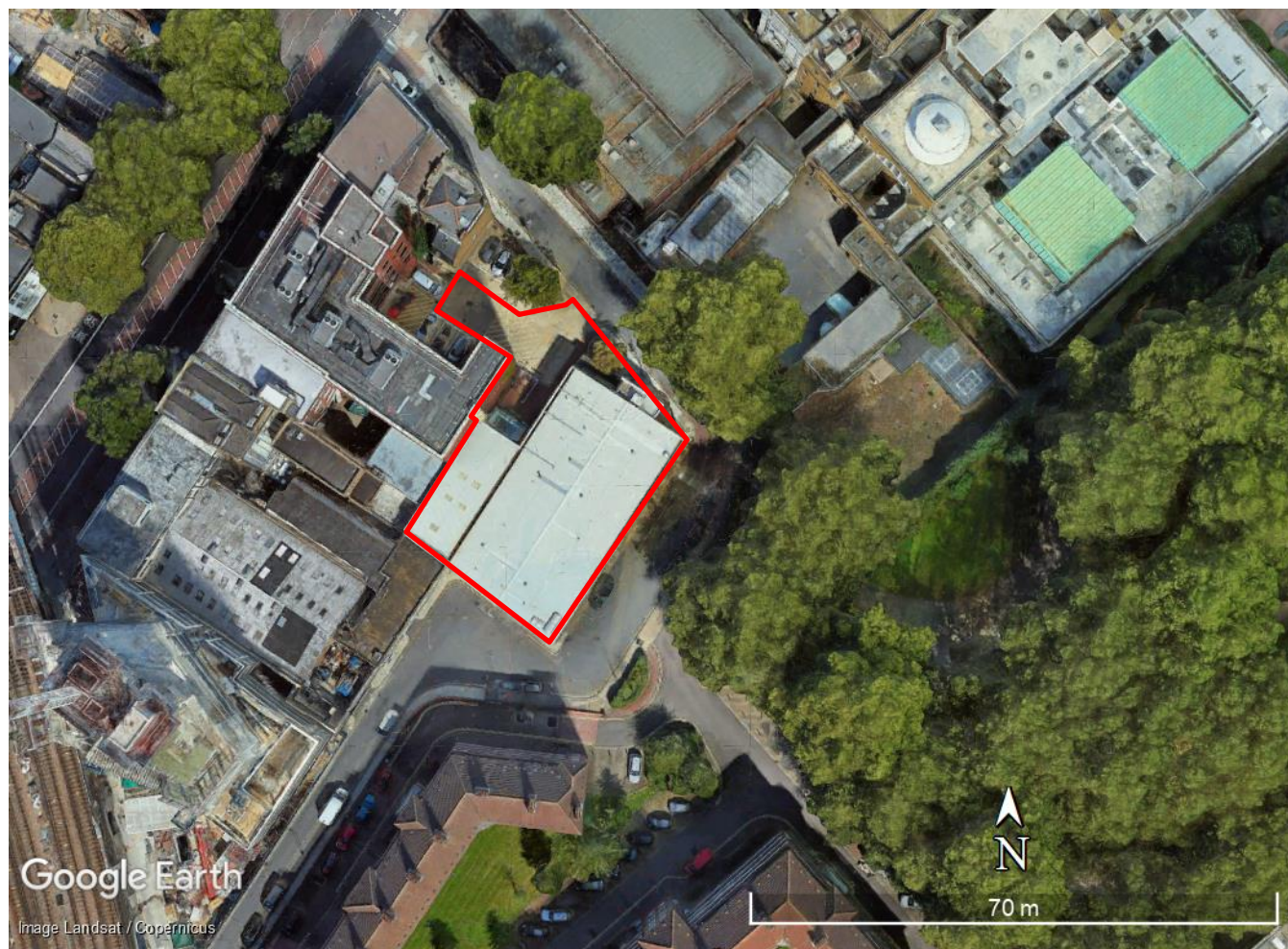


Figure 1-1 – Avonmouth House Site location

2 Policy

The following policy from the London Plan outlines guidance for developments in reducing waste and supporting a circular economy.

2.1 The London Plan

2.1.1 Policy SI 2 Minimising greenhouse gas emissions

F. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

3 Methodology

This report follows the guidance outlined in the GLA Whole Life-Cycle Carbon Assessments guidance document.

Whole life-cycle carbon emissions are the total greenhouse gas emissions arising a development over its lifetime, from the emissions associated with raw material extraction, the manufacture and transport of building materials, to installation/construction, operation, maintenance and eventual material disposal. There is currently limited guidance on how a whole life cycle assessment should be conducted and what is required to be included in the scope. As such the methodology for the assessment has been outlined within this report, stating what has been included and what has been excluded.

The assessment follows the guidance for whole life carbon assessments outlined in EN 15978:2011. Calculations were undertaken using One Click LCA's 'GLA' Tool. The purpose of this assessment is to assess the whole life cycle carbon emissions of the proposed development and to inform design decisions to reduce life cycle carbon emissions. The object of the assessment is the building and site, although all building elements were not included as information is not available at this stage.

Due to the early design stage at which this LCA is conducted, detailed information regarding the build-up of certain construction elements was not available. As such a provisional LCA has been carried out utilising information from typical details based on the performance, design and environmental profile detailed by the design team. Information was provided by the design team regarding these needs to inform the assumptions contained within this provisional LCA, full calculations were undertaken. As such figures are likely to change once the design itself becomes more detailed. Calculations will be updated with the appropriate information as and when it becomes available.

The building elements covered by the assessment are outlined in Table 3.1.

Area	Element
Substructure	Ground Floor
	Foundations
Superstructure	Frame
	Upper Floors
	Roof
	External Walls
	Windows and External Doors
	Internal Walls and Partitions
	Internal Doors
Finishes	Wall Finishes
	Floor Finishes
	Ceiling Finishes
Building Services	Building Services
External Works	Roads, Paths and Pavings

Table 3.1 – Building elements covered by the LCA

The reference study period for this LCA was 60 years, as per the default.

The scope of this Life cycle assessment includes the product, construction, use and end of life stages. The stages are outlined in Table 3.2, with an indication of what stage sections have been included within the scope of this report.

Stage	Product			Construction		Use							End of Life				
	A					B							C				D
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw Material	Transport	Manufacturing	Transport	Construction	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Waste Processing	Disposal	Benefits and Loads Beyond the System Boundary
Included in LCA?	✓	✓	✓	✓	✓	✗	✗	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓

Table 3.2 – Stages of the LCA

This is a provisional life cycle assessment conducted before technical design, as such, it is not fully comprehensive and is based on information provided by the design team, as well as assumptions on likely material use. Where reliable or accurate information was not available, the stage has been excluded. The proposed development was modelled within IES VE, with the primary constructions input into the model. These results were then exported to One Click LCA's 'GLA' Tool.

3.1 Product (A1 – A3)

The product stage covers the cradle to gate processes for the materials required for the building.

3.1.1 Raw Material, Transport & Manufacturing (A1, A2 & A3)

For each building element, the most relevant Environmental Product Declaration (EPD) was identified for each included building element.

These were included within the scope of the assessment, with the information is covered within the EPD of the relevant selected product. The full source of EPDs is outlined in the Appendix.

3.2 Construction (A4 – A5)

The construction stage covers the impact of the process of transport and constructing the development.

3.2.1 Transport (A4)

The transport stage covers the transport of all materials and products required, from the manufacturing plant through to the site.

Transport figures have been calculated based on default values of distance and mode of transport for each material included within the LCA, which are based on regional typical values for each product type. All transport calculations exclude return trips.

3.2.2 Construction (A5)

The construction stage covers energy and water use during the process of construction, as well as any ancillary materials and waste products generated by the construction process. Construction emissions have been included per material based on default wastage assumptions within OneClick LCA.

3.3 Use (B1 – B7)

The use phase covers the use of the building to meet the specified functional and technical performance over its reference study period, from the completion of construction until deconstruction/demolition at the end of its life.

3.3.1 Use (B1)

This covers any emissions to the environment during the normal use of the building, such as refrigerant leakage or the release of substances from the building façade, coated surfaces or floor finishes.

The commercial section of the development is proposed with VRF heating and cooling. As the quantity of refrigerant cannot be quantified at this stage, this could not be quantified and as such this has been excluded from the scope of this report.

3.3.2 Maintenance & Repair (B2 & B3)

Maintenance covers activities carried out to maintain the functional performance of the building, such as floor cleaning. These could not be quantified and as such have been excluded from the scope of this report.

Repair covers works carried out to repair building components, to allow it to maintain its functional performance, such as replacement of broken components. Certain materials have been identified with a percentage repair rate per year estimated, as per Table 3.3 below.

Building Element	Estimated Repair (%/Year)
Internal Finishes	1%
External Area Finishes	1%
Plasterboard	1%
Services	1%
Glazing	1%
Doors	1%
Bricks	1%
Mortar	1%

Table 3.2 – Estimated Repair Rate per Year

3.3.3 Replacement & Refurbishment (B4 & B5)

This section covers the replacement of damaged components which cannot be repaired or have come to the end of their manufacturer's specified life.

These have been included within the scope of the assessment and are calculated based on default service life based on each materials product category or manufacturers defined service life.

3.3.4 Operational Energy Use (B6)

This section covers energy used in the normal operation of the building, such as energy for heating, cooling, ventilation, lighting hot water and pumps and fans, as well as unregulated energy use by the occupants.

Full energy calculations have been carried out and the operational energy use figures utilised within this LCA are representative of the results of that assessment.

3.3.5 Operational Water use

Operation water use covers all water used for the normal operation of the building.

It has been included within the scope of the report and has been calculated based on the maximum occupancy of the development, based on 105/l/day for the maximum number of occupants for the development.

3.4 End of Life (C1-C4)

This section covers the decommissioning of the development once it has no further use at the end of its reference study period.

3.4.1 Demolition, Transport, Waste Processing & Disposal (C1, C2, C3 & C4)

This section covers the demolition of the building at the end of its life, the transport of demolition waste to end of life disposal sites, the sorting, collection and processing of different waste routes at a waste processing facility and the management and treatment at a disposal facility.

C1 demolition emissions have been estimated for the proposed development at the end of its life, based on GIA.

C2, C3 and C4 have been included within the scope of the report and are based on the material inputs into the development, please refer to the GLA Life Cycle Analysis Spreadsheet for assumed EOL action for each material.

3.5 Benefits and Loads Beyond the System Boundary (D)

This section covers any benefits or burdens accruing from the repurposing of elements discarded from the development, or any energy recovered from them beyond the project's life cycle.

This has been included within the scope of the report and is based on the material inputs into the development, please refer to the GLA Life Cycle Analysis Spreadsheet for assumed EOL action for each material. This has been included within the scope of the report and is based on the material inputs into the development, please refer to the GLA Life Cycle Analysis Spreadsheet for assumed EOL action for each material. Recycling potential is only reported for materials with shares of primary manufacturing, i.e. if a product is made of recycled material, it no longer has recycling potential. 5% of losses are assumed for recycling (the remaining 95% are recycled).

4 Results

Refer to the GLA Life Cycle Analysis Spreadsheet for the results of the assessment.

5 Actions

5.1 Construction Materials

5.1.1 Recycled binders within the concrete

Concrete is the largest single material contributor to the buildings life cycle emissions. During this assessment, a concrete mix has been used, that uses 20% recycled cement replacements (such as ground granulated blast-furnace slag or fly ash from power stations) this is above the typical level which is considered to be 10% recycled binders. Products are available in London that can contain a recycled cement binder content of up to 55%, which can have a significant impact on the carbon emissions of the product.

The use of these products will be considered by the design team when throughout the design, particularly at the technical design phase.

5.1.2 Recycled Aggregate

Depending on the application and type of concrete, there are opportunities to use recycled aggregates and demolition waste in new on-site concrete. This prevents waste and minimises the requirement for new resources. Using recycled aggregates directly from the demolition of the site minimise emissions associated with the transport of materials.

5.1.3 Reduce the volume of concrete

Design decisions will be taken which minimise the volume of concrete within the building, by ensuring a highly efficient structural design is conducted. This could include reducing the overdesign of slabs and columns and optimising the amount of reinforcement vs concrete thickness. Floorplate construction may also be further rationalised to reduce material usage. This has the added benefit of reducing the project cost, as well as life cycle carbon emissions. It will be reviewed at the technical design stage.

5.1.4 Façade design and material selection

The proposed cladding system standard brickwork façade. This is a standardised material that requires little to no maintenance over its life and can often be reclaimed at the end of the building's life. The development also uses standardised window and door designs, allowing more efficient design and production, reducing waste and material use.

5.1.5 Select low carbon materials

When selecting and specifying products across the development, products should be identified that have low embodied carbon. This information can often be found in the product Environmental Product Declaration (EPD), if available.

5.2 Transportation to site

All construction materials should be sourced from suppliers as close as possible to the site. This minimises transportation distances and emissions associated with the transport of these materials.

5.3 Use

The energy strategy proposes the use of heat pumps for the commercial sections of the development. Quantities cannot be confirmed at this early design stage. However, to minimise in-use emissions from refrigerant leaks, all best practice procedures will be followed when installing refrigerant pipework. All relevant F-gas rules will be followed with regard to testing for leakage, based on the installed system size.

5.4 Material replacement and refurbishment

A comprehensive maintenance and repair schedule should be in place throughout the developments life to ensure that all equipment and materials last for their full lifespan, minimising the requirement to replace or refurbish building elements or systems.

5.5 Energy use

The development will be designed to comply with the London plans energy requirements, and as such demonstrates a significant improvement over the building regulation baseline. An energy strategy has been developed following the energy hierarchy 'Be Lean, Be Clean, Be Green'. The development employs an efficient building fabric, including well-insulated walls and highly efficient glazing, efficient systems and PV Panels to maximise carbon savings for the site. The development also proposes to use a communal air source heat pump for the provision of space heating and hot water resulting in significant in-use carbon savings.

5.6 Water use

Low flow fixtures and fitting should be used within the development to ensure water usage is kept to a minimum. Water meters should be installed to encourage residents to reduce their water usage. As all bedrooms are single occupancy the water use has been calculated based on the number of units and the targeted water efficiency of 105l/person/day.

5.7 Deconstruction

The demolition and deconstruction of the development should be considered at the design stage. Materials that can be separated from each other to allow for more effective recycling at the end of life should be considered.

6 Conclusion

This report summarises the whole life carbon assessment undertaken for the development at Avonmouth House to meet the sustainability requirements of the London Plan.

The assessment follows the guidance for whole life carbon assessments outlined in EN 1578:2011. Calculations were undertaken using One Click LCA's 'GLA' Tool. The purpose of this assessment is to assess the whole life cycle carbon emissions of the proposed development and to inform design decisions to reduce life cycle carbon emissions.

Results are reported in the GLA Life Cycle Assessment spreadsheet.

Actions have been identified to help reduce the impact of the development in each of the life cycle stages included within the scope of this report.

7 Appendix

Full EPD list

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country	Upstream database	Density	Product Category Rules (PCR)	Notes about PCR
Acoustic insulation sheets from polyethylene foam	10 mm, 0.272 kg/m2, 27.2 kg/m3, sound reduction: 21 dB	Impactodan 10	DANOSA	International EPD System	S-P-01924	EPD Membrana acústica Danosa Impactodan 5 Impactodan 10	EN15804+A1	Third-party verified (as per ISO 14025)	2020	spain	ecoinvent	27.2	PCR 2012:01 Construction products and Construction services, ver. 2.331	Only with EN15804
Air handling unit, with heat recovery through plate heat exchanger	10 000 m3/h (5885.8 ft3/min), 1256 kg/unit (2769 lbs/unit)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2019	LOCAL	ecoinvent		EN15804+A1	-
Aluminium frame window	24.27 kg/m2, 2.3 m2/unit		Organisation professionnelle représentative des concepteurs, fabricants et installateurs de menuiseries extérieures en profilés aluminium	INIES	INIES_CFEN20181017_145645, 8715	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2018	france	ecoinvent		EN15804+A1	EN15804+A1
Aluminium framed glazed doors, double glazed, per sq. meter	83% glass, 12% aluminium, 3% steel, 40.79	AXILE Family, EDGE Family, KINETIC Family, ELITE Aero	Optima	International EPD System	S-P-00480	EPD Aluminium Framed Glazed Doors	EN15804+A1	Third-party verified (as per ISO 14025)	2017	unitedKingdom	ecoinvent		PCR 2012:01 Construction products and Construction services, ver. 2.01, 09/03/2016	Only with EN15804
Autoclaved aerated concrete block	100-300 mm, 470-770kg/m3	Thermalite	Forterra	BRE	BREG EN EPD000001	EPD Thermalite Autoclaved Aerated Concrete Block (470-770 kg/m3), Forterra Building Products Ltd 2016	EN15804+A1	Third-party verified (as per ISO 14025)	2016	unitedKingdom	ecoinvent	600	EN15804+A1	-
Autoclaved aerated concrete blocks	460-760 kg/m3	Aircrete	BPCF	IBU	EPD-BPC-20170093-CCD1-EN	EPD UK Manufactured Precast Aerated Concrete Blocks as produced by members of the Aircrete Products Association (APA) a product group of British Precast	EN15804+A1	Third-party verified (as per ISO 14025)	2017	unitedKingdom	GaBi	600	PCR Aerated concrete, 07/2014	Only with EN15804
Bitumen-polymer membrane roofing, 2 layer, fully torched			EWA	EPD Norge	NEPD00269E	Multi layer fully torched modified bitumen roof waterproofing system, Bitumen Waterproofing Association	EN15804+A1	Third-party verified (as per ISO 14025)	2014	europa, belgium, denmark, finland, germany, italy, netherlands, sweden	-	1232	NPCR 022 Roof Waterproofing, rev1	Only with EN15804
Ceramic tiles, glazed, for floor application	10 mm, 27.263 kg/m2, 2200 kg/m3			INSIDE/INSIDE	NIBE258	EPD 21002-NIBE258 - Keramische tegels (dikte 10 mm) geglazuurd; gelijmd	EN15804+A1	Third-party verified (as per ISO 14025)	2020	netherlands	ecoinvent		EN15804+A1	-
Concrete paving	15.4 m2/m3, 96 units/m3	Andover Textured	Aggregate Industries	International EPD System	S-P-00684	EPD for precast concrete paving	EN15804+A1	Third-party verified (as per ISO 14025)	2015	unitedKingdom	ecoinvent	2400	PCR 2013:02 Concrete, ver. 1.02, UN CPC 375	Only with EN15804
Electricity distribution system, cabling and central, for all building types	per m2 GFA			One Click LCA	-	One Click LCA	EN15804	Internally verified	2019	LOCAL	ecoinvent		EN15804	-
Electricity distribution system, cabling and	per m2 GFA			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2019	LOCAL	ecoinvent		EN15804+A1	-

central, for all building types														
Emulsion matt paint for allround interior use	Pigment: Lightfast Pigments, binder: PVA Copolymer emulsion , solvent: Water, 1.443 kg/l, 18m2/l, 0.16 kg/m2	Supermatt White, Almond White, Gardenia, Magnolia, Light Base, Medium Base	Dulux Trade	MRPI	1.1.00023.2017	EPD Dulux Trade Supermatt	EN15804+A1	Third-party verified (as per ISO 14025)	2017	unitedKingdom	ecoinvent		EN15804+A1	-
Fire protective calcium-silicate board	8-30 x 1200x2500 mm, 680-970 kg/m3	PROMATECT-100/200/250 and PROMAXON-Typ A	Promat	IBU	EPD-PMT-20150174-IBA1-EN	EPD PROMATECT-100 / PROMATECT-200 / PROMATECT-250 / PROMAXON-Typ A Mineral bound light weight fire protective boards Promat	EN15804+A1	Third-party verified (as per ISO 14025)	2015	belgium	GaBi	890	PCR Calcium silicate insulating materials, 07/2014	Only with EN15804
Floor screed mortar, cement screed	1500 kg/m3, EPD coverage: > 1500 kg/m3		quickmix Gruppe GmbH & Co. KG	IBU	EPD-QMX-20160208-IBC1-DE	Oekobau.dat 2017-I, EPD Mineralische Werkmörtel: Estrichmörtel Zementestrich quickmix Gruppe GmbH & Co. KG	EN15804+A1	Third-party verified (as per ISO 14025)	2014	germany	GaBi	1500	PCR Mineralische Werkmörtel, 10/2012	Only with EN15804
Flooring adhesive sealants	1.25 - 1.65 kg/dm3,	SikaBond-54 Parquet, 52 Parquet, 95 Parquet, 50 Parquet, AT-80, AT-82, T-40	Sika	EPD Norge	NEPD-343-232-EN	NEPD-343-232-EN	EN15804+A1	Third-party verified (as per ISO 14025)	2014	europa	GaBi	1420	PCR Reaction resin products, 07/2014	Only with EN15804
Glass wool insulation panels, unfaced, generic	L = 0.031 W/mK, R = 3.23 m2K/W (18 ft2°Fh/BTU), 25 kg/m3 (1.56 lbs/ft3), (applicable for densities: 0-25 kg/m3 (0-1.56 lbs/ft3)), Lambda=0.031 W/(m.K)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	25	EN15804+A1	-
Gypsum finish plaster, damage resistant	97.4% gypsum, 2.6% additives, 1250 kg/m3	Thistle DuraFinish	British Gypsum Saint Gobain	International EPD System	S-P-00611	EPD Thistle DuraFinish	EN15804+A1	Third-party verified (as per ISO 14025)	2014	unitedKingdom	ecoinvent		PCR 2012:01 Construction Products and Construction services, ver. 1.2 and CPC 54 Construction services.	Only with EN15804
Gypsum plaster board, regular, generic	6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	858.0280607	EN15804+A1	-
Gypsum plasterboard	12.5 mm, 8.985 kg/m2 (average product weight)		Etex Building Performance	BRE	BREG EN EPD 000204	EPD GTEC Plasterboard	EN15804+A1	Third-party verified (as per ISO 14025)	2018	unitedKingdom	ecoinvent	718.8	EN15804+A1	-
Heat distribution system (water heat distribution) for residential building	per m2 GFA			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2019	LOCAL	ecoinvent		EN15804+A1	-
Mortar	Mortar (1:4), Uses the general UK average cement mixture			ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom	-		EN15804+A1	-
Mortar	Mortar (1:6), Modelled with CEM I			ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom	-		EN15804+A1	-
Natural stone products for paving, wallstones and curbs	2600 kg/m3	Roriz, Star Blue, Star White	Beer Sten AS	EPD Norge	NEPD-2987-1665-EN	EPD BeerEcoSten ® Porto - The Star Selection	EN15804+A1	Third-party verified (as per ISO 14025)	2021	portugal	ecoinvent	2600	NPCR 018 v.1.0 Part B for natural stone products, aggregates and fillers (20.05.2020)	Only with EN15804
Non-vinyl polymeric composite flooring	3.126 kg/m2	Cirro Resilient	Manningto n Commercial	NSF	EPD10266	EPD Floor Resilient Tile	ISO14040	Third-party verified (as per ISO 14025)	2019	USA, unitedKingdom	GaBi		PCR Flooring EPD Requirements. UL 10010-7, 2018	Only with EN15804
Non-woven carpet underlay	11 mm, 1.05 kg/m2	Texfelt Springbond Underlay	Texfelt	BRE	BREG EN EPD 000269	EPD Texfelt Springbond Underlay	EN15804+A1	Third-party verified (as per ISO 14025)	2019	unitedKingdom	ecoinvent		EN15804+A1	-
Plywood for wall application, spruce	12 mm, 6 kg/m2, 500 kg/m3			INSIDE/INSIDE	NIBE990	EPD 21002-NIBE990 - Multiplex; vuren; db	EN15804+A1	Third-party verified (as per ISO 14025)	2020	netherlands	ecoinvent	500	EN15804+A1	-

Polypropylene vapour membrane, French average	0.18 kg/m2		MDEGD	INIES	INIES_DPAR20180223_160939, 7991	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2018	france	ecoinvent		EN15804+A1	EN15804+A1
Porcelain stoneware slabs, for cladding and flooring	Thickness: 6 mm, 15 kg/m2, 2500 kg/m3		Fiandre	International EPD System	S-P-01026	EPD PORCELAIN STONEWARE SLABS FOR INTERNAL AND EXTERNAL WALLS AND FLOORINGS (THICKNESS 6 mm)	EN15804+A1	Third-party verified (as per ISO 14025)	2017	italy	ecoinvent	2500	PCR 2012:01 Construction products and Construction services, ver. 2.2, 30/05/2017	Only with EN15804
Precast concrete block	700-2100 kg/m3		BPCF	IBU	EPD-BPC-20170092-CCD1-EN	EPD UK Manufactured Precast Concrete Blocks Produced by members of the Concrete Block Association (CBA) a product group of British Precast	EN15804+A1	Third-party verified (as per ISO 14025)	2017	unitedKingdom	GaBi	1425	PCR Pre-cast concrete components, 07/2014	Only with EN15804
Raised access flooring panels, chipboard in galvanized steel envelope	600 x 600 mm, 10.5 kg/m2	RMG600	Kingspan Access Floors	International EPD System	S-P-02797	EPD RMG600 Access Floor Panels Kingspan Access Floors Limited	EN15804+A1, EN15804+A2	Third-party verified (as per ISO 14025)	2021	unitedKingdom	ecoinvent		EN 15804+A2	-
Ready-mix concrete, normal-strength, generic	C30/37 (4400/5400 PSI), 20% recycled binders in cement (300 kg/m3 / 18.72 lbs/ft3)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	2400	EN15804+A1	-
Ready-mix concrete, normal-strength, generic	C40/50 (5800/7300 PSI), 20% recycled binders in cement (400 kg/m3 / 24.97 lbs/ft3)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	2400	EN15804+A1	-
Red brick, average production, UK	215 mm x 102.5 mm x 65 mm, 2.13 kg/unit, 1485 kg/m3		Brick Development Association (BDA) Ltd (2019)	BRE	BREG EN EPD000002, issue 04	EPD BDA Generic Brick, The Brick Development Association	EN15804+A1	Third-party verified (as per ISO 14025)	2019	unitedKingdom	ecoinvent	1485	EN15804+A1	-
Reinforcement steel (rebar), generic	97% recycled content (typical), A615			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	7850	EN15804+A1	-
Rock wool insulation for ETICS and flat roofs	R=1 m2K/W, L=0.044 W/mK, 44 mm, 0.97 kg/m2, 22 kg/m3, Lambda=0.044 W/(m.K)		Rockwool	-	-	EPD Stone Wool Thermal Insulation for buildings	EN15804+A1	Third-party verified (as per ISO 14025)	2021	unitedKingdom	ecoinvent	22	EN15804+A1	-
Rock wool insulation, unfaced	R = 1 m2K/W, Lambda = 0.044 W/mK, 44 mm, 22 kg/m3		Rockwool	-	-	EPD ROCKWOOL Stone Wool Thermal Insulation	EN15804+A1	Third-party verified (as per ISO 14025)	2015	unitedKingdom	ecoinvent	22	EN15804+A1	-
Rock wool/mineral wool insulation	0.035-0.039 W/mK, 106-160 kg/m3		Knauf	BRE	BREG EN EPD000097	EPD Rock Mineral Wool Insulation 106 - 160 kg/cu.m, Knauf Insulation 2016	EN15804+A1	Third-party verified (as per ISO 14025)	2016	unitedKingdom	ecoinvent	136	EN15804+A1	-
Rock wool/mineral wool insulation	0.036-0.040 W/mK, 160-205 kg/m3		Knauf	BRE	BREG EN EPD000098	EPD Rock Mineral Wool Insulation 160 - 205 kg/cu.m, Knauf Insulation 2016	EN15804+A1	Third-party verified (as per ISO 14025)	2016	unitedKingdom	ecoinvent	181	EN15804+A1	-
Sand, compacted dry density	1682 kg/m3			One Click LCA	-	LCA inventory for sand quarry operation, Ecoinvent 2016	EN15804	Internally verified	2020	LOCAL	ecoinvent	1682	EN15804	-
Skylight or roof light - with frame				ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom	-		EN15804+A1	-
Steel cladding	6.62 kg/m2		L'ENVELOPPE METALLIQUE DU BATIMENT	INIES	INIES_CBAR20210727_091313, 27005	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2021	france	ecoinvent		EN15804+A1	EN15804+A1
Structural steel profiles, generic	90% recycled content (typical), I, H, U, L, and T sections, S235, S275 and S355			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	7850	EN15804+A1	-
Structural steel profiles, generic	60% recycled content, I, H, U, L, and T sections, S235, S275 and S355			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL	ecoinvent	7850	EN15804+A1	-
Tile adhesive, for laying tiles and natural stones, interior application	5.5 kg/m2	webercol flex	SAINT GOBAIN WEBER FRANCE	INIES	INIES_IWEB2020129_171728, 14075	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2020	france	ecoinvent		EN15804+A1	EN15804+A1
Tufted carpet tiles	3.78kg/m2, max.490 g/m2 pile, PA 6		Milliken	IBU	EPD-MIL-20180160-CBD1-EN	EPD Tufted carpet tiles pile material polyamide 6, 100% recycled content maximum total pile weight 490 g/m2, Comfort Lite backing system Milliken	EN15804+A1	Third-party verified (as per ISO 14025)	2018	unitedKingdom	GaBi		PCR Floor coverings, 02/2018	Only with EN15804
Ventilation ducting	per m linear, D: 63 mm (2.48 in)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2019	LOCAL	ecoinvent		EN15804+A1	-
Ventilation system for residential buildings				One Click LCA		One Click LCA generic construction definitions				LOCAL	Ecoinvent			

Waterproofing membrane, single component, cold applied, from PU	1.5 mm, 1.98 kg/m2	Sikalastic-625	Sika	BRE	BREG EN EPD0000111	BREGENEPD000111	EN15804+A1	Third-party verified (as per ISO 14025)	2016	unitedKingdom	GaBi	1320	EN15804+A1	-
Wooden and engineered wood interior doors	1,23 m x 2,18 m, 72.8 kg/m2		VHI	IBU	EPD-VHI-20200102-IBG1-DE	EPD Innentüren aus Holz und Holzwerkstoffen Verband der Deutschen Holzwerkstoffindustrie e. V. (VHI)	EN15804+A1	Third-party verified (as per ISO 14025)	2020	germany	GaBi		PCR Fenster und Türen, 12.2018	Only with EN15804
Rock wool insulation, unfaced	R = 1 m2K/W, Lambda = 0.044 W/mK, 44 mm, 22 kg/m3		Rockwool	-	-	EPD ROCKWOOL Stone Wool Thermal Insulation	EN15804+A1	Third-party verified (as per ISO 14025)	2015	unitedKingdom	ecoinvent	22	EN15804+A1	-