

Whole Life Carbon Assessment (RIBA Stage 2)

Charlton Brown Architecture &
Interiors Limited

11 and 11A View Road
N6 4DJ
London Borough of Haringey



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The figures within this report may be based on indicative modelling and an assumed specification outlined within the relevant sections. Therefore, this modelling may not represent the as built emission or energy use of the Proposed Development and further modelling may need to be undertaken at detailed design stage to confirm precise performance figures. Please contact SRE should you have any questions, or should you wish further modelling to be undertaken post planning.

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Executive Summary

Executive Summary

This Whole Life Carbon Assessment (WLCA) has been written by SRE Ltd. for Charlton Brown Architecture and Interiors Limited (The Architect) on behalf of Alistair and Paula Flutter (The Client) to demonstrate the embodied and operational carbon emissions for the proposed demolition and construction at 11 and 11A View Road, London Borough of Haringey (the Proposed Development).

The aim of this assessment is to model the whole life carbon impact of this proposed design to compare it to an alternative scheme where areas of the existing building façade including the front boundary are retained with all other building fabric demolished. This will allow a judgement to be made in relation to the potential future impacts of the Proposed Development.

Using Elmhurst Design SAP and OneClick LCA software, SRE has undertaken this assessment in line with the RICS Whole Life Carbon Assessment for the Built Environment, which forms the basis for this initial assessment. The assessment has taken into account embodied and regulated operational energy of the proposed scope of works, commencing from a “cleared flat site” in accordance with RICS guidelines.

The overall results show that the Proposed Development will have a cradle to grave emission of 149.40 tonnes CO₂e less than projected emissions produced from the retained and extended Refurbished Scenario.

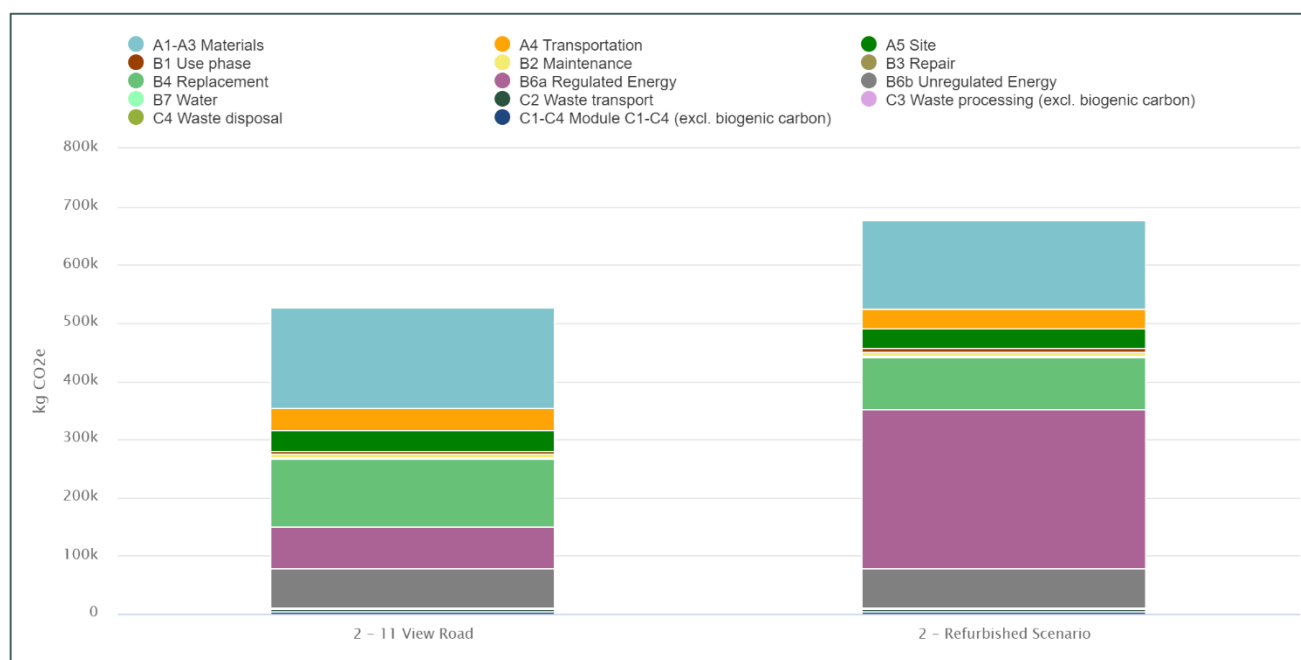
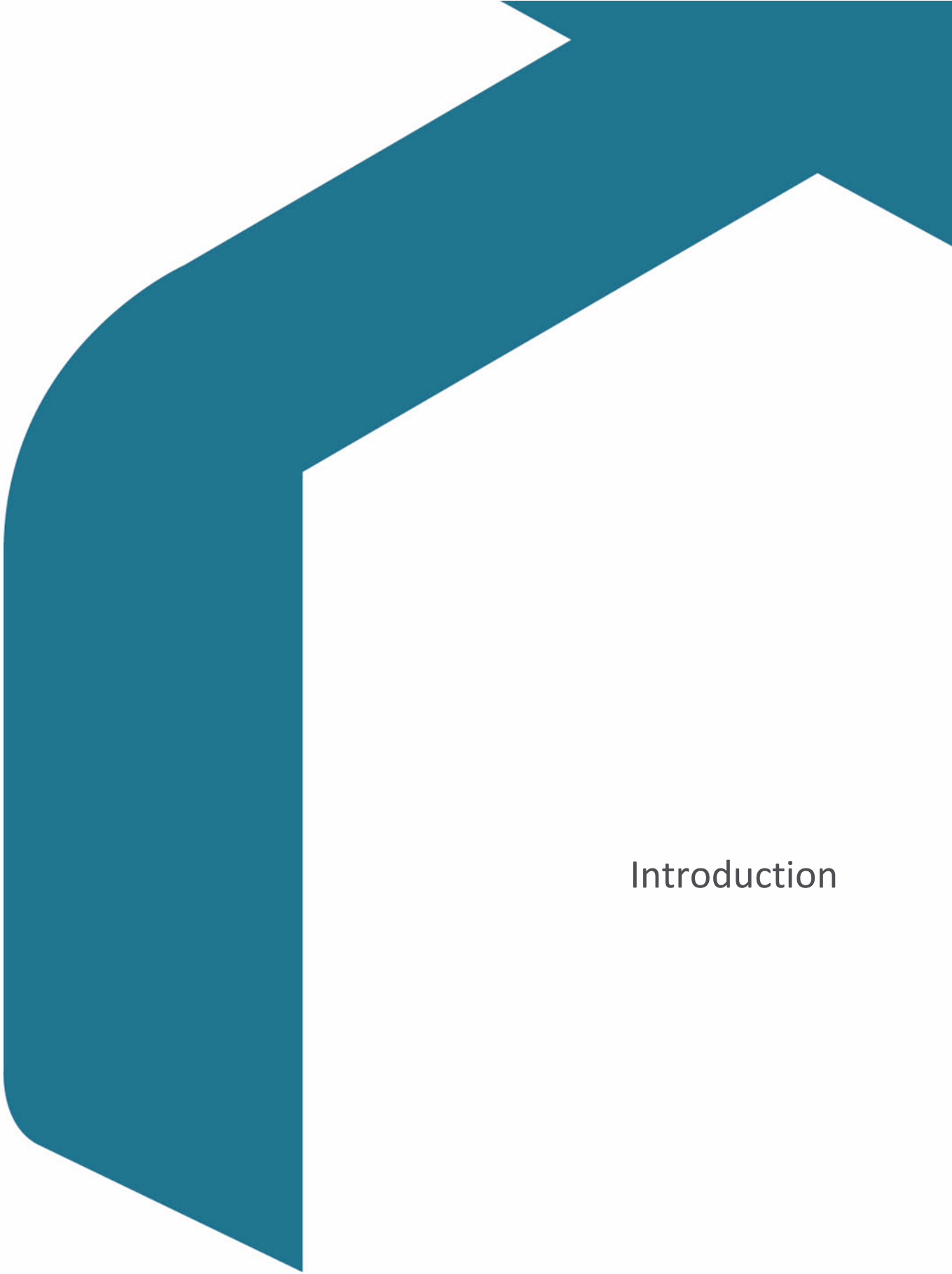


Figure 1 - Carbon Emissions by Life Cycle (OneClick LCA)

Scenarios	Description	Cradle-to-Grave Carbon Emissions (kgCO ₂ e)
Refurbishment	Retention of all Applicable Facades.	672,942
Proposed	Demolition and New Construction	523,538

Table 1: LCA modelling scenarios.



Introduction

1.0 Introduction

This Whole Life Carbon Assessment has been written by SRE Ltd. for Charlton Brown Architecture and Interiors Limited (The Architect) on behalf of Alistair & Paula Flutter (the Client) to demonstrate the embodied and operational carbon emissions incorporated in the demolition and new construction of the residential dwelling at 11 and 11A View Road, London (the Proposed Development) located within the London Borough of Haringey.

The Whole Life Carbon Assessment (WLCA) is being undertaken in accordance with the London Plan Whole Life-Cycle Carbon (WLC) emissions in line with Policy SI 2 F of the 2021 London Plan. The WLC assessment has followed the 'RICS Whole Life Carbon Assessment for the Built Environment' (First Edition, November 2017) where applicable which provides technical detail and calculation requirements on the practical implementation of the European Standard EN 15978:2011 'Sustainability of Construction Works' principles.

The assessment aims to model the whole life carbon impact of two scenarios: the proposed design (hereafter known as the Proposed Scenario) and compare this to an alternative scheme (hereafter known as the Refurbishment Scenario) where a proportion of the existing fabric is retained and enhanced to provide the identical floor area of residential accommodation where a comparison can be made in relation to the potential future impacts of the Proposed Development.

The assessment utilises recognised industry software and Elmhurst Energy SAP modelling to evaluate the lifecycle carbon content of materials and M&E fittings of the site, over a 60-year lifespan. The assessment of the materials' carbon emissions also includes the replacement of certain items in line with industry standards.

1.1 The Site and Proposed Development

The Proposed Development is located on View Road to the east of Highgate Golf Club. The site is situated within the Highgate Conservation Area designated in 1967 and is set back from the street to present a small driveway.

The Proposed Scenario includes the demolition of all existing building fabric, in order to construct a new development which is extended to the rear boundary in comparison to the existing geometry. It also incorporates the installation of a more efficient building fabric with regards to thermal performance as well as utilising recycled materials from the planned demolition such as brickwork cladding.



Figure 2 – Floor Plan of the Proposed Scenario (Charlton Brown Architecture & Interiors)

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Methodology and Standards

2.0 Methodology and Standards

There are multiple definitions of Zero Carbon Development which can impact the method of reporting. For the purpose of this assessment, the following definition from the UK Green Building Council has been used:

Net Zero Carbon – Whole Life: “When the amount of carbon emissions associated with the building’s embodied and operational impacts over the life of the building, including its disposal, are zero or negative”.

To this end, the WLCA has been undertaken in accordance with the ‘RICS Whole Life Carbon Assessment for the Built Environment’ (First Edition, November 2017) which outlines the process of WLCA as well as what is and is not included. The aim of the RICS document provides clarity on the EN 15978: 2011 for the sustainability assessment of buildings and describes the approach required within this methodology as well as including standard practice assumptions for material transport, service life and replacement. Adding to the breadth of the RICS methodology, the London Plan’s WLC guidance details the inputs required at each building life cycle stage in order to capture a thorough assessment, encapsulating all building element groups which can then be inputted into the LCA following RICS standard practice assumptions.

The aim of this assessment is to model the whole life carbon impact of the proposed design in accordance with RICS guidance in order to calculate the quantity of carbon offset required to mitigate all fit-out emissions associated with Unit 8. Through the use of OneClick LCA and IES VE software, both embodied and operational carbon emissions can be calculated dependent on the inputs of materials and MEP schemes which have been

2.1 Lifecycle Stages

The embodied carbon of a site included within a WLC assessment, are separated into the following sections. Those highlighted in bold represent the minimum stages required to be reported for completion of a WLCA according to RICS, 2017.

Stage	Stage Identifier	Stage Name and Scope	Description
Product Stage	A1 – A3	Product Stage	Raw material to Product Completion
Construction Process Stage	A4 – A5	Construction Process Stage: Transport to site and construction installation process.	Transportation of goods to site and installation on-site
Use Stage	B1	In Use Emissions	Emissions arising during the life of the building from its components – such as the emissions from GHG and HFC blown insulation, which leeches over time.
	B2	Maintenance, cleaning, and associated works	Emissions associated with energy and products for maintenance
	B3	Repair Emissions	Reasonable allowance for repairing unpredictable damage over and above the standard maintenance regime.
	B4	Replacement Emissions	Emissions associated with the replacement of items within the building, in accordance with the standard expected lifespan.
	B6	Operational Energy Use	Emissions associated with the operation of the building through the operation of its technical systems over the life of the building.
	B7	Operational Water Use	Emissions associated with the water use during the operation of a building during its operational life.
End of Life Stage	C1	Deconstruction and Demolition Emissions	Emissions covered by all site activity required to dismantle, deconstruct and/or demolish the built asset
	C2	Transport Emissions	Transport emissions associated with discarded items from site
	C3	Waste Processing for reuse, recovery, or recycling emissions	Processing emissions for waste arising from the demolition of the site when processing for recycling, reuse, or recovery
	C4	Disposal Emissions	Emissions associated with the disposal of materials which are not being recycled and are to be disposed of.

Table 2 - Outline of all assessment elements covered by the WLCA

In line with the above guidance, the WLCA has been undertaken up to RIBA Stage 2 for planning. The following data has been used to formulate this WLCA model (where any information is not available at the point of assessment, industry assumptions have been implemented):

- OneClick LCA material & component database.
- Drawings, plans, sections, and elevations from Project Team.
- Dynamic Energy Modelling (SAP) results calculated by SRE Ltd.
- Material build-ups provided by the Project Team.

The RICS Document states that all new build projects are assumed to commence from a cleared, flat site with demolition works of the previous structure decoupled from the new construction. It is therefore necessary that any future demolition of the new development is included within its own WLC calculation where this represents the proposed end of life scenario which is not solely attributable to any following schemes.

2.2 Outcomes and Units

The units required to be used within the outputs of the WLCA are clearly defined within the RICS documentation to ensure the equal judgement of developments to peer projects following the principle of normalisation in order to establish different ratings of carbon intensity. Therefore, the following unit is to be implemented within this assessment.

- $\text{kgCO}_2\text{e/m}^2$ of Net Internal Area.

2.3 Assumptions

By means of incorporating all various emissions sources within this WLCA, certain assumptions are to be drawn dependent on information not available at the time of appointment and study.

The details of the RICS WLCA OneClick inputs and SRE Assumptions Summary is provided in Appendix E.

Transport

Sourcing of materials during the construction phase (Module A) normally requires 2 movement trips - from the area of manufacture to site of storage followed by a vehicle movement from the site of storage to the development location ready for construction. All transportation values for this assessment have been taken from the RICS, 2017 guidance which dictates distance values and method of transportation dependent on each material's country of origin. These values are evidenced within Appendix C of this report.

Materials

All materials inputted into the OneClick LCA software have been selected on a like-for-like basis. All specific materials available within the tool have been inputted with the associated quantity calculated from provided drawings. Where specified materials are not available on the database, the closest alternative has been chosen, where it shares the most similar function, form, and carbon intensity to the applied option. A full list of material assumptions can be found within Appendix E.

Replacement

Across the Proposed Development's lifecycle, materials inputted during primary construction will require replacement resulting from damage caused by wear and tear, improper use as well as various environmental factors. The replacement of materials proposed in the development's lifecycle is measured within the LCA tool and based on information stating assumed material service periods within the RICS documentation evidenced in Appendix D. The lifespan of a product is generic and is based on the element type. This will therefore not perfectly represent the replacement ratios of the structure's lifecycle but instead industry standards for replacement rates.

Limitations

The WLCA for the Proposed Development has understandably been conducted as accurately as possible, with consideration and detailing of all inputs undertaken to ensure that the modelling and materials reflect the proposed works and solely capture the embodied carbon linked to the construction. However, as with all material assessments, the products used within this WLCA may not exactly reflect all those being installed on site and is highlighted where this is the case.

The changing of products and plans will alter the embodied carbon information used within the WLCA, in addition to the mileage associated with transport to the site from suppliers and trade workers. Any change in material quantity, wastage, replacement, or transportation will alter emissions values hence the adoption of assumed industry values for these variables.

3.0 Results

3.1 Outcomes per lifecycle stage

The embodied carbon result encapsulates all lifecycle stages (A1-A5, B1-B5, C1-C4) other than Modules B6-B7 (operational energy and water) and module D (benefits beyond the proposed system). Operational carbon emissions are therefore represented within Modules B6 (operational energy demand) and B7 (water demand). The total calculated WLC result for the Proposed Development is 525,538kgCO₂e (525.54 tonnes CO₂e), and the embodied carbon equates to 382,700kgCO₂e (382.70 tonnes CO₂e), as seen in Table 3 below. Table 4 details the results of the alternative Refurbished Scenario.

Module	Embodied Carbon Emissions	Operational Carbon Emissions	Whole Life Carbon Emissions
A1-A5 Construction Process stage (kgCO ₂ e)	247,523		247,523
Biogenic Carbon (kgCO ₂ e)	-69,169		-69,169
B1-B5 Use Stage (kgCO ₂ e)	131,012		131,012
B6-B7 Operational Demands (kgCO ₂ e)		140,838	140,838
C1-C4 End of Life stage (kgCO ₂ e)	73,334		73,334
Total Carbon Emissions (kgCO ₂ e)	382,700	140,838	525,538
GWP – (kgCO ₂ e/m ²)	570.96	210.12	781.06
Module D Benefits to Future Systems (kgCO ₂ e)	-31,419		

Table 3 - WLCA Emission Results per Lifecycle Stage of the Proposed Scenario.

Module	Embodied Carbon Emissions	Operational Carbon Emissions	Whole Life Carbon Emissions
A1-A5 Construction Process stage (kgCO ₂ e)	220,778		220,778
Biogenic Carbon (kgCO ₂ e)	-69,357		-69,357
B1-B5 Use Stage (kgCO ₂ e)	104,912		104,912
B6-B7 Operational Demands (kgCO ₂ e)		343,207	343,207
C1-C4 End of Life stage (kgCO ₂ e)	73,403		73,403
Total Carbon Emissions (kgCO ₂ e)	329,736	343,207	672,942
GWP – (kgCO ₂ e/m ²)	491.95	512.04	1,003.99
Module D Benefits to Future Systems (kgCO ₂ e)	-30,922		

Table 4 - WLCA Emission Results per Lifecycle Stage of the Refurbished Scenario.

It should be noted that the figures presented in Table 3 and Table 4 are the result of a point-in-time assessment, based on the information available at the time of the assessment. As more quantities and details of the components become available, the WLCA model will be updated to capture the embodied carbon emissions for the development more accurately.

3.2 Discussion of Results.

The WLCA modelling has been carried out for both the Proposed and Refurbishment Scenarios. By completing the WLCA model for both scenarios and reviewing the design information available to date, the following observations have been made.

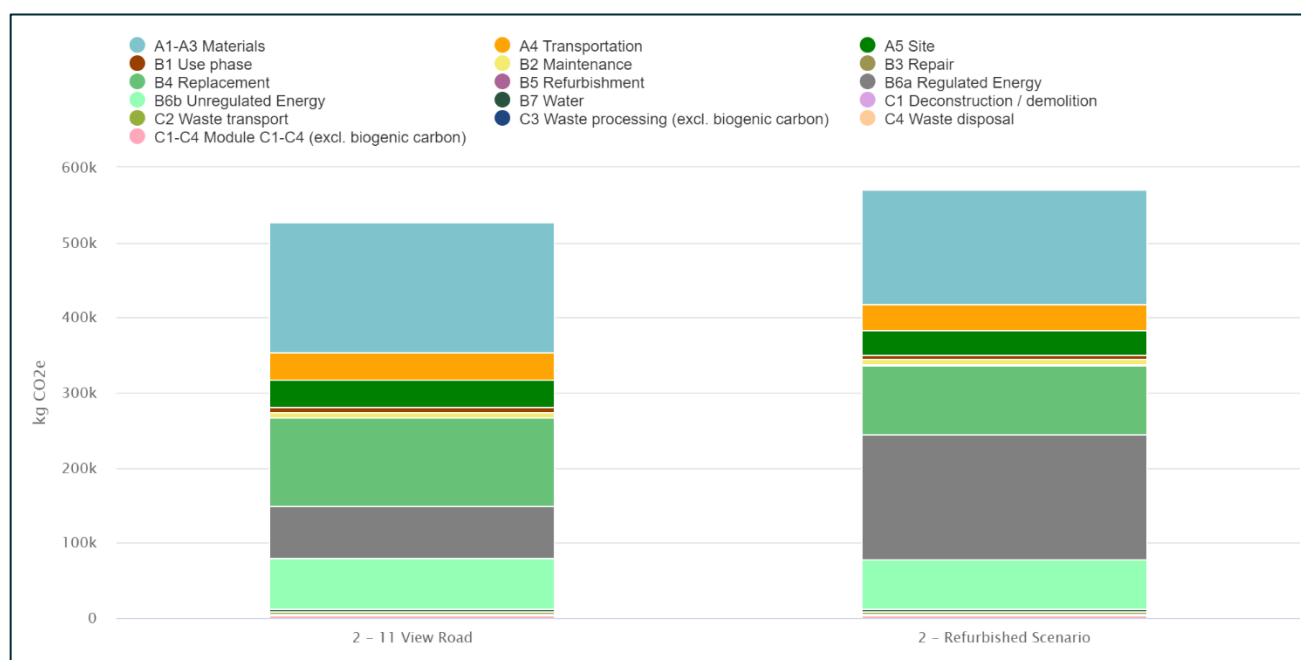


Figure 3 - Comparison of Lifecycle Stage Elements for the Proposed and Refurbishment scenarios

Figure 3 above highlights the total kgCO_{2e} impact of both the Proposed and Refurbishment Scenarios at all life-cycle stages from Cradle-to-Grave. It can be observed that the embodied carbon associated with materials in the Proposed Scenario is greater due to all aspects of the build being from new construction in place of replacement. This is limited however through the recycling of brickwork accrued from demolition of the existing fabric highlighting attempts from the design team to reduce embodied carbon emissions.

As a result of the Proposed Scenario consisting of an upgraded fabric structure, Figure 3 above shows that the new construction will be a less carbon intensive option when taking into account all factors. With the new fabric designed to be more efficient with regards to thermal performance, the retention of heat and minimising loss leads to a lower operational energy demand across the lifecycle of the building and will hence be less carbon intensive in the long run. The quantities of materials included in the WLCA model are based on information provided from the Design Team to-date, and include estimations of quantities of muck-away, and materials reclaimed from current site.

It has also been assumed that the existing structure will have a lifespan of 60 years. In reality, there are parts of the existing building structure that are worn and not in good shape. It is not therefore a reasonable assumption that these later extensions will last the assumed 60 years. This may result in some elements needing to be replaced more often than currently modelled which would lead to higher B3 (Repair) and B4 (Replacement) emissions which cannot be predicted within this assessment. As beforementioned, the lifespan of the products used in the modelling are generic and based on element type as per Appendix D. However, it is likely that the existing structure will need additional works and new materials to address its longevity concerns. This has not

been taken into consideration in the present modelling and may therefore result in greater embodied carbon in lifecycle stage B4, Replacement, in the Refurbished Scenario than what is currently modelled.

3.3 Operational Energy Use

As can be seen in Figure 3, carbon emissions within the lifecycle stage B6, Operational Energy Use, represent the most significant impact on the WLC performance of the scheme.

A SAP model has been completed for the Proposed Development to represent the energy performance of the scheme in line with Part L requirements. Energy use related to building services (heating, cooling, hot water, ventilation) and lighting, known as the regulated energy, has been considered and listed below. Figure 4 shows the operational energy consumption in the Proposed Scenario, and Figure 5 shows the operational energy consumption in the Refurbishment Scenario.

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP			
	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	6094.8940	0.1557	948.9161 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	1045.1145	0.1410	147.3386 (264)
Energy for instantaneous electric shower(s)	773.0144	0.1391	107.5434 (264a)
Space and water heating			1096.2546 (265)
Pumps, fans and electric keep-hot	2704.8631	0.1387	375.1979 (267)
Energy for lighting	728.2272	0.1443	105.1057 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2759.4882	0.1313	-362.2060
PV Unit electricity exported	-4.0948	0.1102	-0.4511
Total			-362.6571 (269)
Total CO ₂ , kg/year			1321.4444 (272)
CO ₂ emissions per m ²			1.9600 (273)
EI value			97.5332
EI rating			98 (274)
EI band			A

Figure 4 - Proposed Scenario Energy Consumption by End Use

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP			
	Energy kWh/year	Emission factor kg CO ₂ /kWh	Emissions kg CO ₂ /year
Space heating - main system 1	30889.1516	0.1540	4758.4501 (261)
Total CO ₂ associated with community systems			0.0000 (373)
Water heating (other fuel)	1050.8942	0.1410	148.1534 (264)
Energy for instantaneous electric shower(s)	773.0144	0.1391	107.5434 (264a)
Space and water heating			4906.6035 (265)
Pumps, fans and electric keep-hot	2704.8631	0.1387	375.1979 (267)
Energy for lighting	728.2272	0.1443	105.1057 (268)
Energy saving/generation technologies			
PV Unit electricity used in dwelling	-2760.3471	0.1313	-362.3238
PV Unit electricity exported	-3.2359	0.1022	-0.3306
Total			-362.6545 (269)
Total CO ₂ , kg/year			5131.7960 (272)

Figure 5 - Refurbishment Scenario Energy Consumption by End Use

As can be seen from Figures 5 and 6 above, the total regulated operational energy in the Refurbishment Scenario accounts to a total of 33,382.55kWh/year, whereas the operational energy in the Proposed Scenario shows a significantly lower level of operational energy at 8,582.53kWh/year. This can be attributed to the ability to improve the building fabric performance to a greater level and consistency across the site in the Proposed Scenario, and as such will ultimately end up being the more carbon sensitive approach in the longer term.

Bricks

The environmental impact of bricks can be lessened by reducing the quantity of virgin materials used in construction. The project team has aimed for bricks used in the Proposed Scenario to be reclaimed and therefore is partially culpable for the difference in A1-A3 materials embodied carbon.

Glass

A detailed Thermal Comfort Analysis has been undertaken by SRE, which reviewed the thermal performance of the specified glazing units. This assessment has been undertaken under a climate change scenario to ensure a thermally comfortable environment can be achieved during the lifespan of the buildings.

The use of timber window frames to support triple glazing would represent a step in reducing carbon emissions through including biogenic storage in wooden materials which can also be easily recycled during the development's End of Life (C) stage.

Transportation

At this stage, the RICS recommended transport distances (see Appendix D) have been adopted. It is recommended that locally sourced materials with an EPD should be used where possible.

Waste Removal

Removal of waste has been taken into account as part of Stage C of the WLCA – This will offset the amount of embodied carbon in the scheme.

4.0 Conclusion

This WLCA has been completed to compare the WLC emissions for the Proposed and Refurbished Scenarios at 11 and 11A View Road, Haringey in order to assess the short- and long-term carbon emissions of the two schemes.

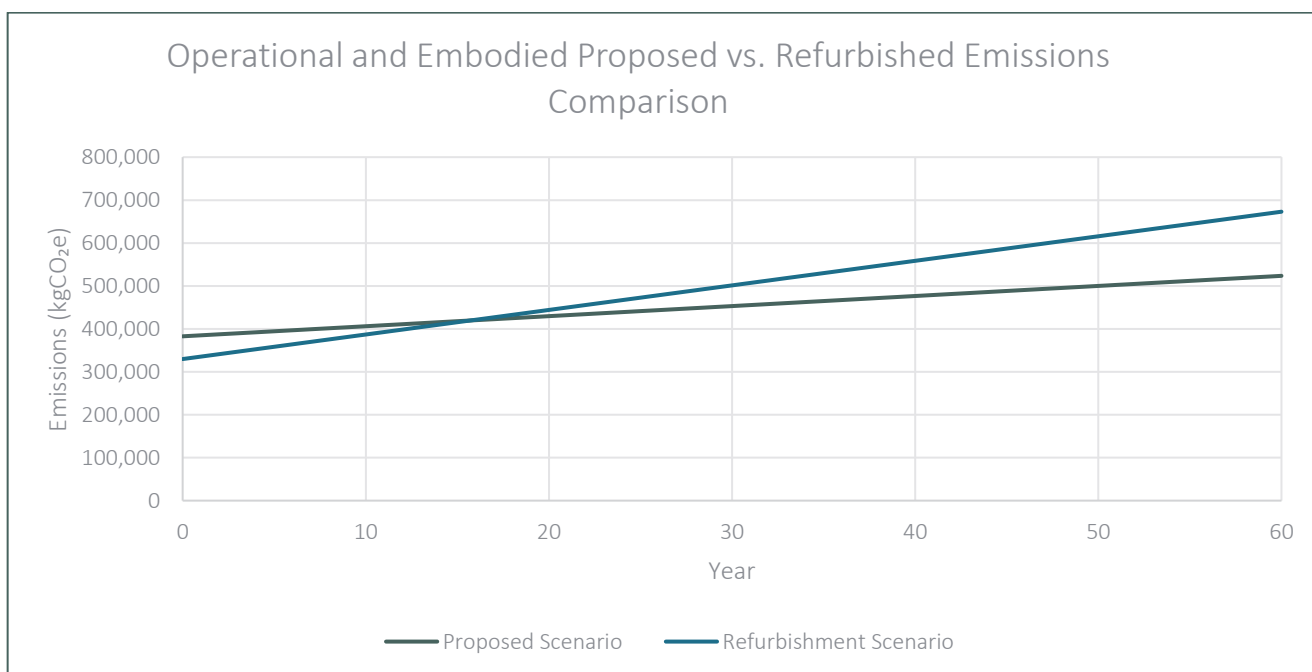
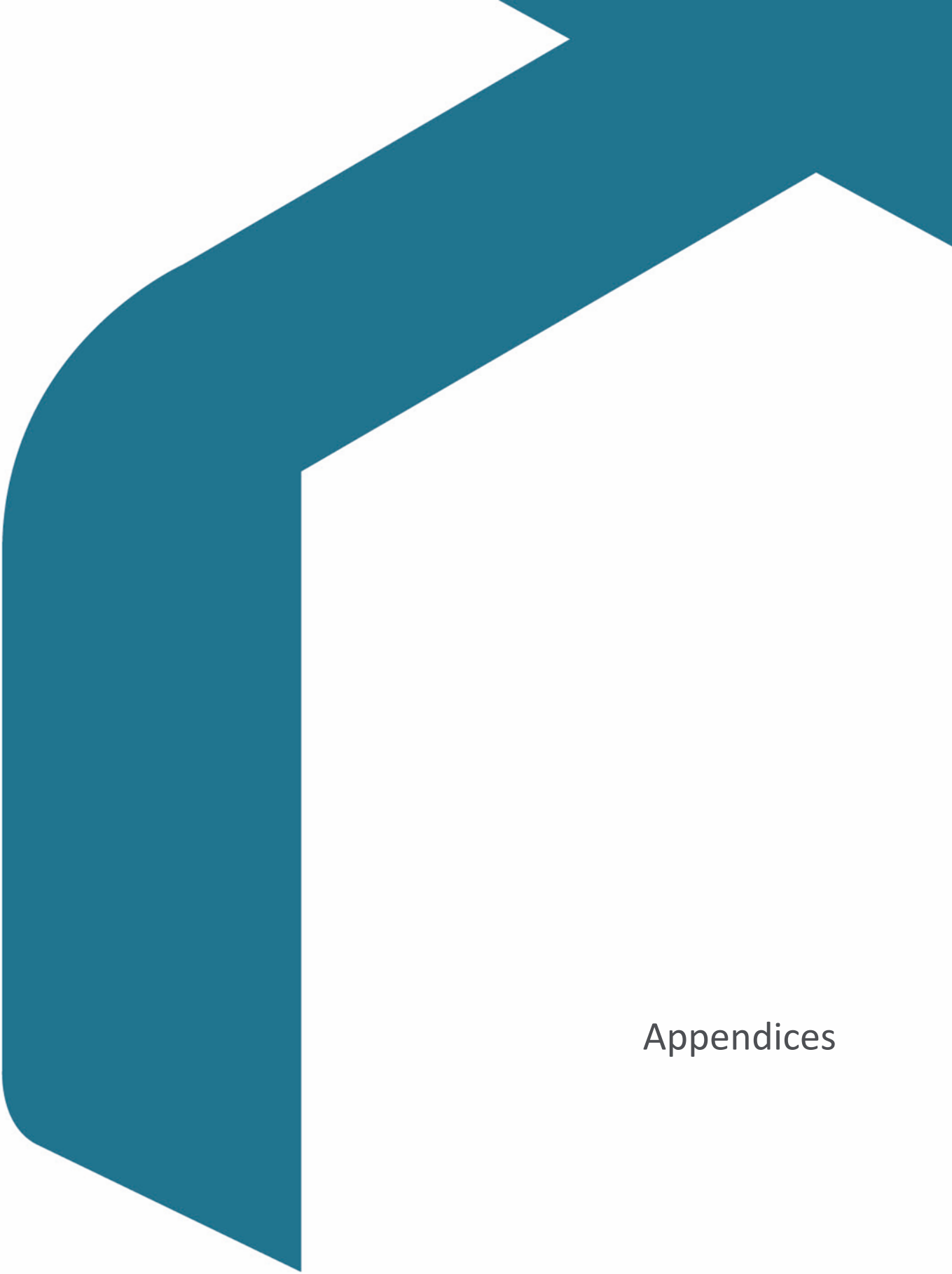


Figure 6 - Graphical Comparison of Carbon Emissions between the Proposed and Refurbished Carbon Emissions

Analysing the 60-year life cycle of the Proposed Development in Figure 6 above, it can be seen that the difference in operational emissions between the two scenarios will equate to the Proposed Scenario becoming the less carbon intensive option at year 16 of the building's lifespan. With embodied materials costs all inputted upon completion, the yearly pro-rata of operational demands upon this material value highlights how the more efficient building fabric despite increasing short term costs, is designed for prolonged carbon reduction, and therefore can be deemed the more environmentally sensitive plan from the two modelled scenarios.

The overall results show that the Proposed Development will have a cradle to grave emission of 149.40 tonnes CO₂e less than projected emissions produced from the Refurbished Scenario. Results from the WCLA modelling indicate that the new construction will ultimately end up being a more carbon sensitive approach in the longer term, taking all factors into account, and is therefore the more sustainable option given that the materials and MEP specifications remain in place through to construction of the development.

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Appendices

Appendix A Carbon Reporting – Embodied and Operational emissions (Proposed Scenario)

Result category	Biogenic carbon (kg CO ₂ e)	A1-A3 Product stage	A4 Transportation to site	A5 Site operations	B1 Use Phase	B2 Maintenance	B3 Repair	B4 Material replacement - materials	B5 Material refurbishment	B6 Operational Energy use - Regulated	B6 Operational Energy use - Unregulated	B7 Operational Water use	C1 Deconstruction / demolition	C2 Waste transportation	C3 Waste processing	C4 Waste disposal	TOTAL kg CO ₂ e	D External Impacts (not included in totals)
0.1 Toxic Mat.																		
0.2 Demolition																		
0.3 Supports																		
0.4 Groundworks																		
0.5 Diversion																		
1 Substructure	0	37 715	11 899	2 961			0							793	88	8	53 464	-6 107
2.1 Frame	0	25 133	335	854			0							401	23		26 746	-19 097
2.2 Upper Floors	-31 007	8 092	4 739	2 063			0	4 077	0					369	31 269	1	19 603	-65
2.3 Roof	-36 800	30 273	8 570	3 346			0	5 750	0					337	37 128	18	48 622	-259
2.4 Stairs & Ramps	-455	713	44	136			0							1	458		898	
2.5 Ext. Walls	0	29 486	6 273	3 578			0	48 134	0					564	49	6	88 093	-2 075
2.6 Windows & Ext. Doors	-233	14 623	245	0			1 666	15 113	0					244	235	0	31 892	-161
2.7. Int. Walls & Partitions	0	19 738	4 427	3 099			0	24 792	0					608	20		52 683	-134
2.8 Int. Doors	-674	385	60	0			0	453	0					4	677	0	905	-265
3 Finishes																		
4 Fittings, furnishings & equipments	0	535	12	22			0	2 766	0					1	4	0	3 341	
5 Services (MEP)	0	7 585	161	7	5 569		0	15 991	0	70 033	66 863	3 942		22	2	1	170 156	-3 255
6 Prefabricated																		
7 Existing bldg																		
8 Ext. works																		
Other or overall site construction				20 432													20 432	
Unclassified / Other						6 702											6 702	
TOTAL kg CO ₂ e	-69 169	174 259	36 765	36 499	5 569	6 702	1 666	117 075	0	70 033	66 863	3 942		3 345	69 953	36	523 538	-31 419

Appendix B Carbon Reporting – Embodied and Operational emissions (Refurbishment Scenario)

Result category	Biogenic carbon (kg CO ₂ e)	A1-A3 Product Stage	A4 Transportation to site	A5 Site operations	B1 Use Phase	B2 Maintenance	B3 Repair	B4 Material replacement - materials	B5 Material refurbishment	B6 Operational Energy use - Regulated	B6 Operational Energy use - Unregulated	B7 Operational Water use	C1 Deconstruction / demolition	C2 Waste transportation	C3 Waste processing	C4 Waste disposal	TOTAL kg CO ₂ e	D External Impacts (not included in totals)
0.1 Toxic Mat.																		
0.2 Demolition																		
0.3 Supports																		
0.4 Groundworks																		
0.5 Diversion																		
1 Substructure	0	31 616	10 072	3 006			0	25 267	0					778	151	12	70 921	-3 867
2.1 Frame	0	26 426	555	904			0							401	23		28 309	-19 097
2.2 Upper Floors	-31 007	8 092	4 739	2 063			0	4 077	0					369	31 269	1	19 604	-65
2.3 Roof	-38 800	30 089	8 596	3 335			0	5 750	0					334	37 127	18	48 450	-256
2.4 Stairs & Ramps	-455	897	175	152			0							3	459		1 232	-3
2.5 Ext. Walls	0	15 971	5 139	865			0							471	56		22 502	-3 704
2.6 Windows & Ext. Doors	-1 096	11 588	487	0			1 659	12 250	0					170	1 100	1	26 160	-522
2.7. Int. Walls & Partitions	0	19 738	4 427	3 099			0	24 792	0					608	20		52 683	-134
2.8 Int. Doors																		
3 Finishes																		
4 Fittings, furnishings & equipments	0	535	29	23			0	2 848	0					1	4	0	3 441	
5 Services (MEP)	0	7 565	156	7	5 569		0	15 977	0	272 402	66 863	3 942		22	2	1	372 505	-3 255
6 Prefabricated																		
7 Existing bldg																		
8 Ext. works																		
Other or overall site construction				20 432													20 432	
Unclassified / Other						6 702											6 702	
TOTAL kg CO ₂ e	-69 357	152 517	34 374	33 887	5 569	6 702	1 659	90 982	0	272 402	66 863	3 942		3 159	70 210	34	672 942	-30 922

Appendix C RICS Transportation Values

Transport Scenario	km by road*	km by sea**
Locally manufacturer e.g., Concrete, aggregate, earth	50	-
Nationally manufactured e.g., plasterboard, blockwork, insulation	300	-
European manufacturers e.g. CLT, façade modules, carpet	1,500	-
Globally manufactured e.g., specialist stone cladding	200	10,000
* Means of transport assumed as average rigid HGV with average laden as per BEIS carbon conversion factors. ** Means of transport assumed as average containership		

Appendix D RICS Material Replacement Values

Building Part	Building Elements/Components	Expected Lifespan
Roof	Roof Coverings	30 years
Superstructure	Internal partitioning and dry lining	30 years
Finishes	Wall Finishes: render/paint	30/10 years respectively
	Floor finishes: Raised Access Floor (RAF)/Finish Layers	30/10 years respectively
	Ceiling finishes: substrate/paint	20/10 years respectively
Furniture, fixings, and Equipment (FF&E)	Loose furniture and fittings	10 years
Services/MEP	Heat source, e.g. boiler, calorifiers	20 years
	Space heating and air treatment	20 years
	Ductwork	20 years
	Electrical installations	30 years
	Lighting fittings	15 years
	Communications installations and controls	15 years
	Water and disposal installations	25 years
	Sanitaryware	20 years
	Lift and conveyor installations	20 years
Façade	Opaque modular cladding e.g. rain screens, ey panels	30 years
	Glazed cladding/curtain walling	35 years
	Windows and external doors	30 years

Appendix E RICS WLCA OneClick Inputs & Assumptions Summary

RICS Category		Element Description	Material Used	Total Qty	Unit
Foundations and Substructure	Foundation, Sub-Surface, Basement and Retaining Walls	Phenolic	Phenolic insulation, glass tissue double faced, L = 0.018 W/mK, R = 3 m2K/W, 54 mm, 1.89 kg/m2, 35 kg/m3, Kooltherm K103 (Kingspan)	92.59	m³
		Blockwork	Autoclaved aerated concrete blocks, 460-760 kg/m3, Aircrete (BPCF)	67.34	m³
		Hollowcore	Hollow core concrete slabs, generic, C30/37 (4400/5400 PSI), 20% recycled binders in cement (300 kg/m3 / 18.72 lbs/ft3), incl. reinforcement	16.84	m³
		Screed	Calcium sulphate screed, 1500 kg/m3	10.02	m³
		Concrete	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% GGBS content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA 2022)	67.02	m³
		Rebar	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615	2131.24	kg
RICS Category		Element Description	Material Used	Total Qty	Unit
Vertical Structures and Façade	External Walls and Façade Columns and Load-Bearing Vertical Structures	Phenolic	Phenolic insulation with glass tissue and aluminium foil facing, L = 0.022 W/mK, R = 3 m2K/W, 66 mm, 3.3 kg/m2, 50 kg/m3, Kooltherm Duct Insulation (Kingspan Insulation)	48.81	m³
		Plasterboard	Gypsum plasterboard, 12.5 mm, 8.985 kg/m2 (average product weight) (Etex Building Performance)	12.20	m³
		Blockwork	Concrete block, masonry, B40, 200x500x200/250 mm (CERIB)	91.08	m³
		Grout	HS2 baseline - Cement grout, Cementitious modified mineral mortar (-)	6.15	m³
		Reclaimed Brick	Reclaimed brick (One Click LCA)	19453.50	kg
		Grout	HS2 baseline - Cement grout, Cementitious modified mineral mortar (-)	2.78	m³
		Clay Tiles	Terracotta clay tiles, interlocking, 45.4 kg/m2 (CENTRE TECHNIQUE DE MATÉRIAUX NATURELS DE CONSTRUCTION)	333.66	m²
		Steel	Structural steel profiles, generic, 20% recycled content, I, H, U, L, and T sections, S235, S275 and S355	5305	m³
		Partitioning Wall	Partitioning wall system (internal insulated wall) with steel studs, glass wool core and gypsum board double siding, 100mm+25mm+25mm, 2.85 K.m2/W, Lambda=0.03508771929824561 W/(m.K), High-Stil 150/100 double Placo Duo'Tech 25-9,8m (PLACOPLATRE)	468.83	m³
RICS Category		Element Description	Material Used	Total Qty	Unit
Horizontal Structures: Beams, Floors and Roofs	Floor Slabs, Ceilings, Roofing Decks, Beams and Roof	LVL	Laminated veneer lumber (LVL), 9% moisture content, 510 kg/m3 (Stora Enso)	337.14	m²
		LVL	Laminated veneer lumber (LVL), 9% moisture content, 510 kg/m3 (Stora Enso)	18.0	m³
		LVL	Laminated veneer lumber (LVL), 9% moisture content, 510 kg/m3 (Stora Enso)	337.14	m²
		Plasterboard	Gypsum plasterboard, fire resistant, 12.5/15 mm, 843 kg/m3, A2 fire class, 10µ water vapour resistance, Gyproc FireLine (British Gypsum (2019))	337.14	m²
		Acoustic	Acoustic partition roll insulation, unfaced, L = 0.043 W/mK, R = 2.3 m2K/W, 100 mm, 1.2 kg/m2, 12 kg/m3, (APR 1200) 100mm (Saint-Gobain ISOVER UK)	337.14	m²

		Floorboard	Fiber-gypsum floorboards, 20 mm, 27 kg/m ² , 1350 kg/m ³ , Fermacell (JAMES HARDIE FRANCE SAS)	337.14	m ²
		Roof Tiles	Roof tiles, clay, French average, ép. 10mm, DONNEE PAR DEFAUT (DED)	333.07	m ²
		Phenolic	Phenolic insulation, glass tissue double faced, L = 0.018 W/mK, R = 3 m ² K/W, 54 mm, 1.89 kg/m ² , 35 kg/m ³ , Kooltherm K103 (Kingspan)	80.98	m ³
		Bitumen	Bitumen-polymer membrane roofing, 2 layer, mechanically fastened (EWA)	337.07	m ²
		Planed Timber	Planed timber, conifer (Treindustrien)	0.77	m ³
		Deltabeam	Slim-floor composite steel beam, painted, 7850 kg/m ³ , linear density 50-800 kg/m, DELTABEAM® Green, Painted (Peikko)	3681	kg
		LVL	Laminated veneer lumber (LVL), 9% moisture content, 510 kg/m ³ (Stora Enso)	333.07	m ²
		LVL	Laminated veneer lumber (LVL), 9% moisture content, 510 kg/m ³ (Stora Enso)	19.00	m ³
		LVL	Laminated veneer lumber (LVL), 9% moisture content, 510 kg/m ³ (Stora Enso)	333.07	m ²
		Planed Timber	Planed timber, conifer (Treindustrien)	2.50	m ³
		Steel	Structural steel profiles, generic, 20% recycled content, I, H, U, L, and T sections, S235, S275 and S355	5177.04	kg
		Green Roof	Green roof assembly, with timber joists	35.00	m
RICS Category		Element Description	Material Used	Total Qty	Unit
Other Structures and Materials	Other Structures and Materials	Chimney	Brick chimney single-duct, 98.3 kg/m	8.33	m
		Staircase	Solid wood staircase, biogenic CO ₂ not subtracted (for CML), 39.8 kg/m, unsustainable management, DONNEE PAR DEFAUT (DED)	6.98	m
		Double Bed	Particleboard double bed frame, 1390 x 1950 mm, 77.8 kg/unit, DOUBLE BED FRAME (Bisley)	5	Unit
	Windows and Doors	Triple Glazing	Glazing system, fire-resistant, triple glazed, CFS 30 (6/5/6), 23 mm, 52 kg/m ² , CFS 30 (6/5/6) (VETROTECH)	116.31	m ²
		Interior Doors	Doors with wooden frame, interior, DONNEE PAR DEFAUT (DED)	23.90	m ²
		Sliding Doors	Wooden sliding closet door, biogenic CO ₂ not subtracted (for CML), 10 mm, 7.35 kg/m ² , DONNEE PAR DEFAUT (DED)	9.09	m ²
		Skylights	Skylight or roof light - with frame	9.07	m ²
		External Doors	Exterior wooden door and windows, double glazed, 24mm, 1.48m x 0.9mm, 36.8kg/m ² , biogenic CO ₂ not subtracted (for CML) (Institut technologique FCBA)	8.74	m ²
RICS Category		Element Description	Material Used	Total Qty	Unit
Building Technology	Building Systems and Installations	PV	Photovoltaic monocrystalline panel (PV), per m ² , 42mm, 11.6 kg/m ² , 60 cells per module, TARKA VSMS 300 (VOLTEC SOLAR)	17	m ²
		LED	LED lighting, P = 40W, DONNEE PAR DEFAUT (DED)	26	Unit
		DHW	Electric water heater (water cylinder), 200 liter capacity, Aquanext Plus, Nuos Plus 200, Aquanext Plus 250, Nuos Plus 250, Aquanext Opti 110, Nuos Evo 110 (Chaffoteaux)	1.5	Unit
		WC	Porcelain WC kit (toilet and tank), 37.4 kg/unit, DURAVIT : Duraplus (023009+087920) KOHLER : Odeon Up (4956CK+E4708 ; 4956CK+E4740 ; 18557K+E4708 ; 18557K+E4740). Brive (E4380+E4452 ; E4380+E4453 ; E4381+E4452 ; E4381+E4453 ; E1730+E4452). Eolia (E4380+E4269). Patio (UJD101+ETB111 ; UJB101+ETB111 ; UJV101+ETB111 ; UJW101+ETB111 ; UJV101+ETB211). Struktura (UJX101+ETE111 ; UJH101+ETE111) // ROCA : VICTORIA (A349392000 ; A349393000 ; A34P395000). DEBBA (A34D999000 ; A34D99L000) (Association Française des Industries de la Salle de Bains)	6	Unit

		Washbasin	Enamelled steel washbasin, 10 kg/unit, DONNEE PAR DEFALT (DED)	7	Unit
		Faucets	Brass faucets, 1.45 kg (IDEAL STANDARD FRANCE)	7	Unit
		Baths	Acrylic bathtub, 20.8 kg/unit, DURAVIT : Starck (700345 ; 700344 ; 700342). D-Code (700097 ; 700098 ; 700104 ; 700105) // - KOHLER : Stil 2 (E6812-00 ; E6811-00). Corvette (E60900-00 ; E60901-00/60901-00 ; E60902-00/60902-00 ; E60903-00/60903-00 ; E60904-00/60904-00 ; E60905-00/60905-00). Struktura (E6D020-00/6D020-00 ; E6D021-00/6D021-00). Odeon Up (E6048-00/E6D231-00 ; E6049-00/E6D232-00 ; E6057-00/E6D234-00 ; E6060-00/E6D235-00 ; E6080-00/E6D233-00) (Association Française des Industries de la Salle de Bains)	6	Unit
		Shower Heads	Shower head, 0.3 kg/unit, HALO181-3 HALO181-4 (SMART AND BLUE)	6	Unit
		ASHP	Reversible air/air heat pump, 66.76 kg/unit, 3.79 kW, ASYG 7 KGTB AOYG 7 KGC UME 25 – 7692774 MOSE 25 - 7692770 FTXM35R2V1B RXM35R MSZ-LN18VGK / MSZ-LN35VGK MXZ-4F83VF SRK25ZSX-W SCM45ZS-W AR09TXFCWAKNEU AJ068TXJ3KG/EU RAS-B13J2KVSG-E RAS-13J2AVSG-E1 SDH20-025NW SDH20-025NWI SDH20-025NWO ASYG 7 KGTB - AOYG 7 KGC - UME 25 – 7692774 - MOSE 25 - 7692770 - FTXM35R2V1B - RXM35R - MSZ-LN18VGK / MSZ-LN35VGK - MXZ-4F83VF - SRK25ZSX-W - SCM45ZS-W - AR09TXFCWAKNEU - AJ068TXJ3KG/EU - RAS-B13J2KVSG-E - RAS-13J2AVSG-E1 - SDH20-025NW - SDH20-025NWI - SDH20-025NWO (Uniclimate)	2	Unit
		Heating Panels	Radiant heating panel, 5.42 kg/unit, Rayonnant RC14D ABELIA - 612616 (Groupe Atlantic)	7	Unit



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