Net Zero Embodied Carbon Summary Report, Stage 2 Analysis

HADSCAL,
Hay on Wye.

02/11/2026

Quality Management

Issue/ Revision	**Issue 1**	**Revision 1**	**Revision 2**	**Revision 3**
Remarks	Draft Issue for Comment	Update to MUGA materials		
Date	30/10/2026	02/11/2026		
Prepared by	Gwen Forwood	Gwen Forwood		
Position	Associate Director	Associate Director		
Signed				
Reviewed by	Gareth Davies	Gareth Davies		
Position	Director	Director		
Signed				
Project Number	P-01436	P-01436		

Disclaimer - The LCA predictions of embodied and operational impacts (including costs) conducted using the One Click LCA software, by their very nature, cannot be exact. It is not possible to track all the impacts associated with a product or service back through history accurately. One Click LCA software has been built and tested to enable informed decisions when comparing design options. Generic cost and environmental impact coefficients do not necessarily correspond to those of individual brands of the same product or service due to differences within industries in the way these products and services are delivered. Additionally, the modelling is only as accurate as the information provided, where this is not robust enough assumptions have to be made to ensure modelling can take place. One Click LCA and RedSix Ltd cannot make assurances regarding the accuracy of these reports for the above reasons.

© 2026 RedSix. All rights Reserved.

CONTENTS

1. Introduction 1
2. Project Scope 1
3. Background – Net Zero Carbon & UKGBC 2
4. Methodology 3

RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023 4

Assessment Datasets 6

5. Scoping 6
6. Results and Discussion 7

Most Impactful Materials (Non-Decarbonised Scenario) 11

7. UKGBC Net Zero Carbon Process 12
8. Next Steps 13

Appendix A – OneClick Material Data Extract 14

1. INTRODUCTION

RedSix has been appointed to undertake a Net Zero Embodied Carbon assessment for the proposed development at HADSCAL, Hay on Wye.

The purpose of this report is to outline the findings of a concept design stage net zero embodied carbon modelling analysis and detail the indicative embodied carbon associated with the proposed design. This will facilitate the option to purchase carbon offsets and influence the design through carbon reduction measures. The software used to conduct this analysis was OneClick LCA, an online life cycle assessment tool. This assessment follows the UKGBC Net Zero framework and the RICS methodology for whole life carbon (Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023) which are referred to throughout the report.

This analysis demonstrates the achievement of the '1.1 Net Zero Carbon – Construction' route of the UKGBC Net Zero Framework, and further analysis should be conducted throughout the construction process, once a full bill of quantities is available. Another study would need to be conducted which would demonstrate the achievement of route '1.2 Net Zero Carbon – Operational Energy', which is not covered within this study.

This report outlines the initial findings of the Concept Design Stage Net Zero Embodied Carbon assessment.

2. PROJECT SCOPE

The proposed development comprises of a new leisure and community centre, 10 no. business units, community gardens and external sports and leisure spaces located at Hay on Wye. The external site consists of hard-standing parking areas, footpaths, roads, seating areas and sports areas.

The following drawing packs were used to inform this analysis:

- Architectural Pre-Planning Package – CO2 Architects
- Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023
- Net Zero Carbon Buildings: A Framework Definition, 2019
- RIBA Sustainable Outcomes Guide, 2019
- LETI Embodied Carbon Primer, 2020

Additional information was provided through liaison with the design team, which has helped to inform the quantities and material specifications used within this analysis.

3. BACKGROUND – NET ZERO CARBON & UKGBC

The purpose of this Concept Stage Net Zero Embodied Carbon assessment is to develop a pathway to a net zero embodied carbon footprint. 'Net Zero Carbon' is the achievement of effectively delivering zero emissions from the development, through the reduction of embodied carbon where possible and offsetting of any remaining carbon emissions. This analysis has been conducted during the concept design stage and is therefore limited to the current development proposals. Assumptions have been made where detailed information is not yet known.

The UK Green Building Council (UKGBC) have developed a framework definition for net zero carbon buildings, which provides clarity on how to achieve net zero carbon during construction and operation. (Net Zero Carbon Buildings: A Framework Definition, 2019)

The UKGBC framework applies the principles of the RICS methodology for whole life carbon (Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023). At this stage of the framework's development, the emphasis is on the construction (for new buildings and major renovations) definition.

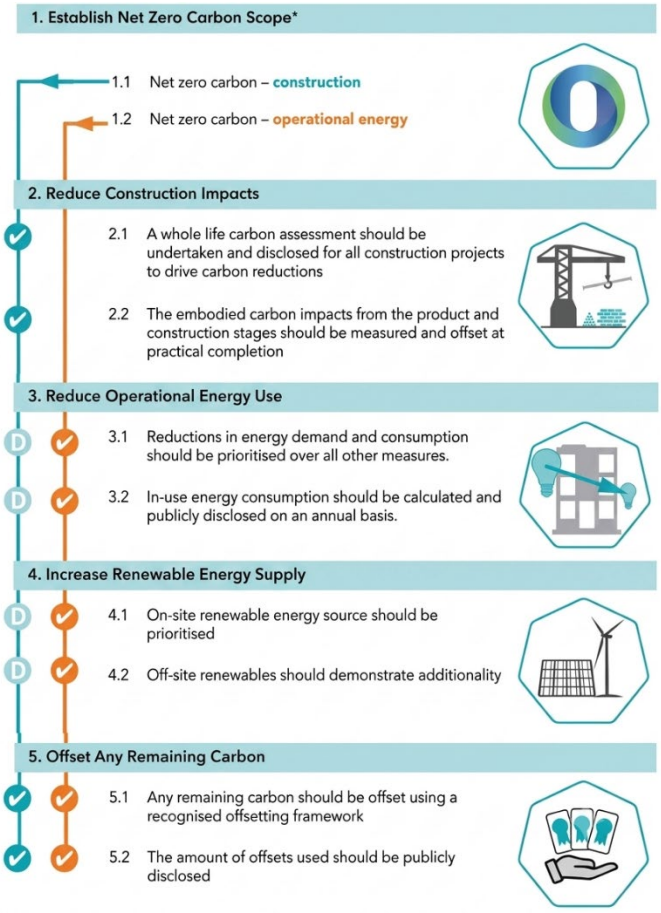

Figure 1: Routes to Net Zero (UKGBC)

The summary image outlines the principles within the UKGBC framework which should be followed to demonstrate alignment with net zero carbon for construction and for operational energy, and where possible this should be achieved annually in use for the development.

This analysis demonstrates at an early stage of the design the achievement of the '1.1 Net Zero Carbon – Construction' route of the UKGBC Framework. It is recommended this analysis, and report is updated during construction stages to reflect a detailed bill of quantities and main contractor site activities. Another study would need to be conducted which would demonstrate the achievement of route '1.2 Net Zero Carbon – Operational Energy', which is not covered within this study.

4. METHODOLOGY

This analysis determines the carbon dioxide emissions associated with the development and has been completed using the OneClick Life Cycle Assessment (LCA) software.

A Life Cycle Assessment (LCA) is an integrative methodology within Life Cycle Design that assesses the impacts of a product or process over its entire life span. The LCA focusses on emissions associated with the non-operational phase of a project, from extraction to demolition or recycling of the material, where possible.

Each of the constituent products/materials/components are measured and assessed by their environmental impacts from 'cradle to grave' (raw material supply to disposal of material) or 'cradle to cradle' (raw material supply to reuse/recovery/recycling of material). This collection of unique environmental profiles is then used to comprehensively evaluate the lifetime effect of the whole building on the embodied carbon. The embodied carbon refers to the carbon dioxide emitted during the manufacture, transport, construction and end of life emissions of building materials.

The embodied carbon is quantified in this report as Global Warming Potential (GWP), which is measured in $kgCO_2e$. Carbon Dioxide, by definition, has a GWP of 1, regardless of the time period used because it is the gas being used in reference. Using $kgCO_2e$ allows a comparison of the global warming impacts of different gasses, as CO_2e pertains to the equivalent carbon dioxide emissions of different substances. The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over a certain period of time.

The aim of conducting an LCA is to support the mitigation of carbon impacts through the design and specification of buildings, whilst encouraging innovation in low-carbon manufacture and assembly. The UK Green Building Council in 2017 predicted that the total embodied carbon in buildings amounted to 22% of environmental emissions, however in 2050 this is predicted to rise to 40%, which highlights the growing influence of embodied carbon. The LCA therefore promotes the Ideology of 'build right' over 'build less' to encourage lower levels of embodied carbon in buildings.

This scope of the proposed works best fits with the UKGBC Net Zero Carbon (NZC) Framework definition 1.1 construction stage, which covers EN 15978 modules A-C, for embodied carbon of materials throughout their whole-life cycle. The modules are outlined in Figure 2 below.

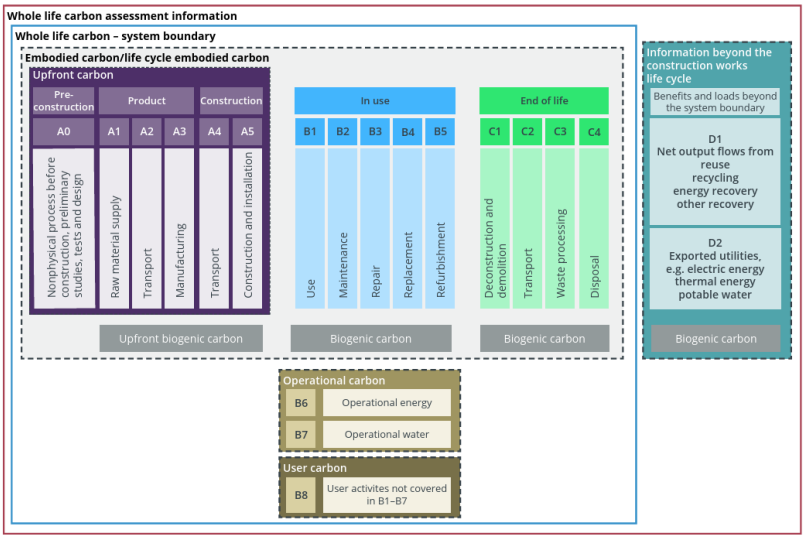

Figure 2: Building life cycle stages (RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023)

RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023

The modelling has been based on the RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023. This is the professional standard for carbon measurements in the construction sector. It is used as a consistent framework for calculating embodied and operational carbon across a development's entire life cycle.

The update, which came into force in July 2024 had three major changes which impact the embodied carbon assessment:

1. **Uncertainty Factors** – these are used to address early-stage uncertainties within the design. The contingency factors are applied during early design stages to ensure carbon targets remain realistic through the design process. The uncertainty factors are split into three categories; contingency factor, carbon data uncertainty factor and quantities uncertainty factor.

   Contingency factor: used to account for uncertainty based on the time of the assessment, outlined below in Table 1.

   Table 1 - Default contingency factors (as outlined in Table 10 RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023)

RICS project phase	RIBA stage	Default contingency factor to apply to all life cycle stages and modules	Additional uncertainty factors
Early design	0–2	15%	n/a
Technical design and construction	3–5	6%	Carbon data uncertainty factor and quantities uncertainty factor
Post-completion	6	0%	Carbon data uncertainty factor and quantities uncertainty factor

   Carbon data uncertainty factor: used to account for variance in carbon emissions by using early-stage generic data to represent products and materials as opposed to specific manufacturers EPDs. A carbon data quality matrix is used to determine a data confidence score which is then translated into the carbon data uncertainty factor using the conversion shown in Table 2.

   Table 2: Carbon data uncertainty factor conversion (as outlined in Table 10 RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023)

Asset carbon confidence score	≤10	10<15	15<20	20<25	25<30	30<35	35<40	40
Carbon data uncertainty factor	7%	6%	5%	4%	3%	2%	1%	0%

   Quantities uncertainty factor: used for the most impactful products and materials as an indication of the uncertainty of the quantities used for the assessment. This is shown in Table 3 and 4 below.

Table 3: Quantity uncertainty levels, used as a weighted average (as outlined in Table 10 RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023)

Quantities uncertainty levels (QULs)	QUL score	Examples
Very good	0	Actual measured/delivered quantities
Good	1	Design measured/calculated/modelled averages
Fair	3	Estimated building information
Sufficient	5	Benchmark building information

Table 4: Quantities uncertainty factor conversion (as outlined in Table 10 RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023)

Asset QUL score	<0.5	<1	<2	<3	3-5
Quantities uncertainty factor	0%	1%	2%	3%	4%

2. **Decarbonisation and Grid Sensitivity** – a methodology which allows a 'decarbonising' and 'non-decarbonising' pathway to be assessed. This allows the impact of future grid decarbonisation and the decarbonisation of material production to be assessed. In an embodied carbon assessment, the decarbonisation of the grid will not impact the results, and so it is only the decarbonisation of material production which will be considered, this is applied as outlined in Table 5 below.

Module	Year of RSP (Buildings)	Decarbonisation scenario
A0–A5	Year 0	No decarbonisation.
B1.1 (emissions and removals from materials)	0–60	No decarbonisation.
B1.2 (fugitive refrigerant emissions)	0–60	50% decarbonisation for all predicted impacts.
B2–B4	0–60	50% decarbonisation for all predicted impacts.
B5 (excluding biogenic carbon)	0–30	Decarbonisation % based on 1.66 x year of performance change for all predicted impacts (e.g. 16.6% if planned change occurs in year 10).
B5 (excluding biogenic carbon)	30–60	50% decarbonisation for all predicted impacts.
B5 (biogenic carbon only)	0–60	No decarbonisation.
C1–C2	Year 60	50% decarbonisation for all predicted impacts.
C3-C4	Year 60	No decarbonisation.
D1	Year 60	50% decarbonisation for all predicted impacts.

3. **Biogenic Carbon and Sequestration** – rules have become tighter on how the carbon stored in materials (such as timber) is measured and reported. It aligns with standard EN 15804+A2 with the aim of limiting greenwashing or premature carbon credits. Biogenic and sequestered carbon must now be reported separately and not included within the reported totals for embodied carbon.

Assessment Datasets

The One Click LCA Default dataset has been used to undertake this assessment, which complies with ISO 14040 and 14044 and is based on Ecoinvent's globally recognised database with regionalised scaling for the UK.

At this stage of design, the data used within the analysis has been as detailed as possible, but where detailed information is not yet readily available assumptions have been made. As the design progresses and additional iterations of this analysis are completed, more accurate and detailed information will be used which will better reflect the true-life cycle impact of the development.

Below is a summary of the steps taken within this analysis so far:

- A OneClick model was built for the proposed development using information provided by the design team as outlined in Section 2. above.
- Each material element of the proposed design was incorporated into the model on OneClick, using the most appropriate elemental template from the OneClick LCA library, where quantities were modified to match the project's design information.
- The resulting overall GWP and any major impacts have been reported (see Section 6.0 Below)

5. SCOPING

RICS guidance states that any facilitating works and site preparation inside the site boundary, and any upfront carbon of works required outside the site boundary to facilitate the project needs to be considered.

At this stage, the following OneClick construction site operations have been included within the assessment:

- Pre-construction demolition/deconstruction scenario (A5.1) – Average pre-construction demolition (per GFA)
- Construction site scenarios – Average construction site activities (per GFA)
- Deconstruction/ demolition scenarios (C1) – Business as usual demolition scenario – 25% of A5.2 impacts

The analysis should cover all items listed in the development's planning package and include any external works that are being conducted within the site boundary. This analysis should be updated during technical design and construction stages to reflect a detailed bill of quantities and main contractor site activities. Where items that are included in the assessment do not have specific qualifying carbon data, equivalent or similar products are to be used.

In line with RICS guidance, a construction site operations scenario has been used to estimate energy, water, and materials use, as well as waste quantities produced on site. Project specific information relating to site operations is not available at this stage of design. Therefore, once more detailed information on site operations becomes available, the construction stage analysis can be conducted using input from the contractor, reflecting more accurate data.

Whole life carbon is based upon a 60-year lifespan for domestic and non-domestic projects (infrastructure 120 years).

6. RESULTS AND DISCUSSION

The following results are provided for both the decarbonised and non-decarbonised scenarios. The non-decarbonised scenario provides a worst-case scenario as it does not rely on the future grid decarbonisation or the decarbonisation of material production. All results have been provided to 2 significant figures, in line with the RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023 for a concept design stage assessment.

As the building is currently at concept design stage, a contingency factor of 15% has been applied, in line with the RICS Whole Life Carbon Assessment for the Built Environment 2nd Edition, September 2023. This factor is applied to all A-D modules, excluding operational energy and water (B6, B7). In addition to the contingency factor, a carbon data uncertainty factor has been added. This accounts for instances where generic representative data has been used rather than manufacturers EPDs. The carbon data uncertainty factor of 2% has been applied, derived from the carbon confidence score. The commentary for each set of results will outline whether these factors have been applied to the displayed results.

Below details the total carbon emissions in tonnes CO_2eq for both the construction stages (A1-A5) and the whole life (A-C) for the development from the OneClick LCA analysis results. These results take into account the contingency factor and carbon data uncertainty factor.

The figure above demonstrates how significant the impact of decarbonisation of the grid and material production has on the embodied carbon of the development. At this early stage, UK average generic templates have been used for numerous materials and so there is scope to improve the carbon impact as the design progresses.

Table 6: Result Comparison against the UK Net Zero Carbon Standard Targets for 2026 and 2027.

	UKNZC Standard Embodied Carbon Targets - All Subsectors - 2026 Target	UKNZC Standard Embodied Carbon Targets - All Subsectors - 2027 Target	HADSCAL RIBA Stage 2 A1-A5 Up-Front Embodied Carbon Result
Upfront A1 - A5 Embodied Carbon (kgCo2e/m2)	**550**	**525**	**527**

Table 6 above confirms that the RIBA stage 2 upfront embodied carbon result currently is in line with 2026 UK NZC standard targets, however, falls slightly short of the 2027 target. As this early stage of works has been based upon a number of assumptions and worst-case scenarios where information is not yet known, it is likely that with further iterations during design and construction stages, this result will further improve.

Figure 3 and 4 on the following page highlights the largest impacts for the development in terms of the material resource types and classifications. The figures demonstrate that the most impactful resource type is HVAC equipment, followed by structural steel. Other resource types relate to internal works, such as plasterboard, stud walls, ceiling finishes, floor finishes and paints/renders. The specification of these will also need to be carefully considered.

The most contributing material type is the Structural steel, with an impact of 299 tonnes of CO_2e (17.2%) followed by C35/45 in-situ concrete foundations and slab with an impact of 253 tonnes of CO_2e (14.6%).

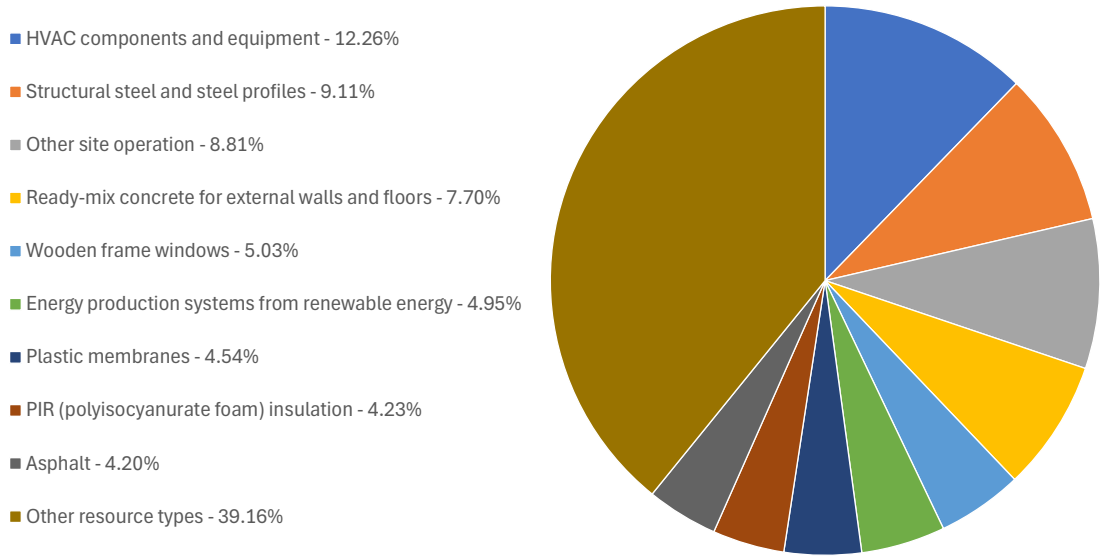

Figure 3: Resource type global warming potential non-decarbonised scenario

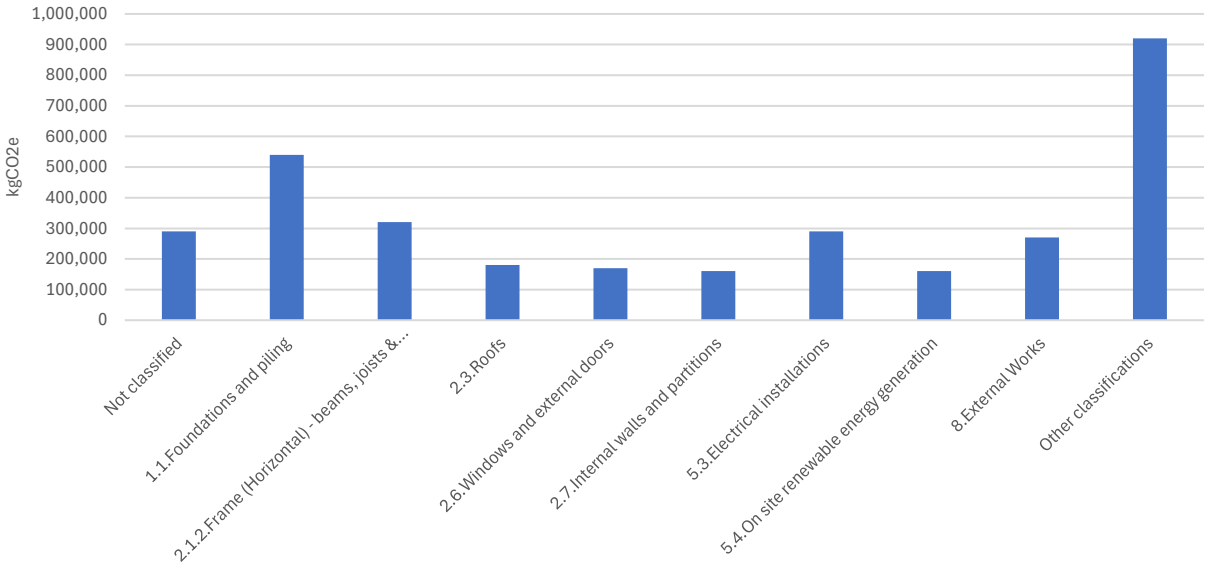

Figure 4: Classification global warming potential non-decarbonised scenario

Figure 5 below shows the most impactful life-cycle stages of the development. Stages A1-A3 Materials is the most impactful life-cycle stage, followed by the second largest impactful life-cycle stage of B4 Replacement.

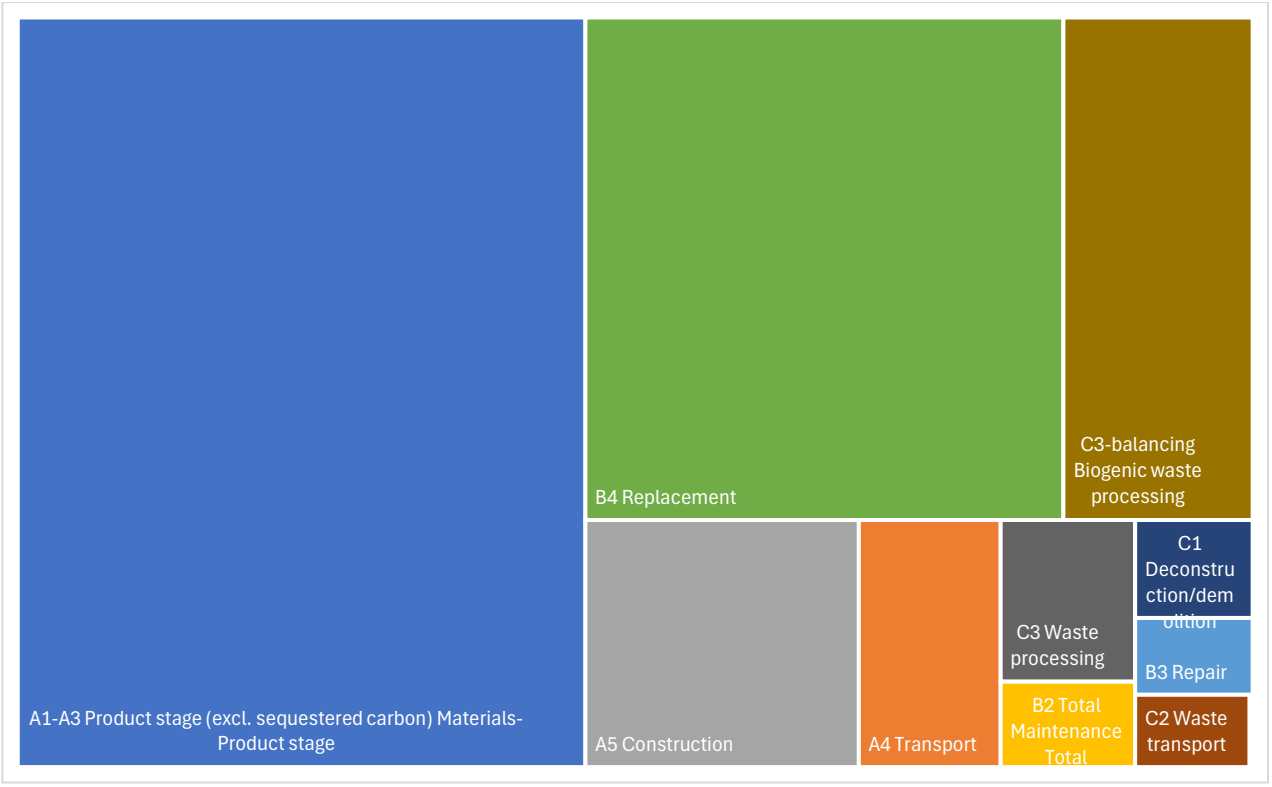

Figure 5: Life-cycle stages global warming potential non-decarbonised scenario

Most Impactful Materials (Non-Decarbonised Scenario)

Generally, the most impactful materials share the following features. They relate to large quantities of concrete and steel, which all have a high carbon content. To reduce the overall impact from these elements the following actions should be implemented:

1. **Structural Open Rolled Steel Sections, UK Average – 299 tCO_2e (17.2%)**

It will be important to assess the steel sections specification within the frame and consider using a material with a higher recycled content. A UK typical scenario has been used within this analysis.

2. **Ready-mix concrete, calculated average for UK (C35/45) – Foundations and GF Slab – 253 tCO_2e (14.6%)**

It will be important to assess the concrete specification and consider using a concrete mix with an improved environmental impact. A UK average scenario has been used within this analysis.

3. **Electricity distribution system. per m2 GFA – 228 tCO_2e (13.1%)**

This is a generic template applied on a per m2 GFIA bases, there is little scope to improve this at this stage of the project.

4. **Velfac triple glazed windows – 164 tCO_2e (9.4%)**

It will be important to assess the window specification, a Velfac generic specification has been used currently, and this can be updated once exact window specification has been determined.

5. **Photovoltaic modules, UK Average – 157 tCO_2e (9.1%)**

The operational carbon benefits of this item outweigh the embodied carbon impacts. A UK average scenario has been used within this analysis, therefore once manufacturer specific information is available, this can be updated.

6. **Asphalt, UK generic - 138 tCO2e (7.9%)**

It will be important to assess the asphalt specification and consider using an asphalt with an improved environmental impact. A UK average scenario has been used within this analysis.

7. **PIR insulation, UK Average – 137 tCO2e (7.9%)**

Once manufacturer specific information becomes available, we can then update this. A UK average scenario has been used within this analysis.

8. **Waterproofing Membranes, UK Average – 135 tCO2e (7.8%)**

Once manufacturer specific information becomes available, we can then update this. A UK average scenario has been used within this analysis.

9. **Porcelain tiles, calculated average for UK -129 tCO2e (7.4%)**

Once manufacturer specific information becomes available, we can then update this. A UK average scenario has been used within this analysis.

10. **Underfloor Heating System - 97 tCO2e (5.6%)**

Once manufacturer specific information becomes available, we can then update this.

7. UKGBC NET ZERO CARBON PROCESS

The UKGBC framework sets out the following process for declaring a development as Net Zero Carbon:

- Quantification of the total carbon emissions associated with the specific development. This analysis has been conducted at a detailed stage of design and will additionally be conducted during construction stage of design and again at practical completion.
- Where 1.1 Net Zero Carbon – construction only is being sought, evidence will need to be provided which demonstrates how the development can reduce its energy demand and consumption in use and maximise any on-site renewable energy. This will allow the achievement of 1.2 Net Zero carbon – Operational Energy within the future. This project is incorporating solar photovoltaics which will help contribute to this item.
- Carbon offsetting should be purchased in order to compensate for the carbon emissions associated with the practical completion modelling (UKGBC recommend existing frameworks, or others could be used providing they meet the same level of rigour). Further information relating to the frameworks are detailed below.
- Public disclosure of the 'minimum level of reporting' required by UKGBC (appendices in the UKGBC definition document provides a template to ensure the minimum information is covered).
- The publicly reported information should be subjected to third-party auditing, to ensure that the information is transparent and proportionate (further detail is provided below).

UKGBC recommends the carbon offsetting frameworks the United Nations Clean Development Mechanism (CDM) (http://cdm.unfccc.int/) and Gold Standard (https://www.goldstandard.org/). Both frameworks facilitate the purchase of carbon credits (known as certified emission reductions, or CER's under the CDM). These credits support development projects e.g., the installation of photovoltaic arrays, reforestation efforts or improvement of cook stoves which all lead to a reduction in carbon emissions (amongst other benefits). The price associated with each tonne of carbon varies between the different projects and on a daily basis (anything from $10-$90 under Gold Standard, or $0.14-$35 under CDM), and the quantity and availability of credits available to purchase on a project-by-project basis also varies (114-142,057t under Gold Standard, 3-1,448,260t under CDM).

Both frameworks are global schemes, with most projects located in developing countries. UKGBC are currently developing further guidance on offsetting frameworks, and some flexibility exists in providing offsets via local projects (possibly even local authority schemes). Any deviation from the recommended frameworks would need to demonstrate credibility, with the benefits made clear and delivery of the projects assured.

The other route to offsetting carbon emissions is to ensure the installation of on-site renewable energy generation (e.g., photovoltaics). Any on-site energy generation must first be used to offset the anticipated operational energy use of the development, with any leftover energy then able to be used for the emissions associated with the construction impacts. This would require full modelling of the operational energy of the development, even if only definition 1.1 is sought.

With regards to the final point of third-party testing, during the final stage of analysis the calculations used for the LCA study should be provided to a third party who will review the information and confirm its validity, if certification was pursued.

8. NEXT STEPS

This modelling study has provided a clear indication of the total embodied carbon of the development at a concept design stage and demonstrates the achievement of the '1.1 Net Zero Carbon – Construction' route of the UKGBC Net Zero Framework.

The next step should be to conduct workshops with the design team and update this analysis utilising more detailed information sourced from the construction design, detailed bill of quantities and contractor site practices. This will provide greater accuracy of the resulting total embodied carbon for the development.

Following this study and when more detailed information is available, another optional study could be conducted which would assess and demonstrate the achievement of route '1.2 Net Zero Carbon – Operational Energy', which is not covered within this study.

An appropriate offsetting route will need to be identified and agreed with the project team, in due course, should offsetting be required.

APPENDIX A – ONECLICK MATERIAL DATA EXTRACT

MATERIAL	QUANTITY	UNITS	DESCRIPTION	COMMENT
1.1.Foundations and Piling				
Granular fill, UK average (IStructE)	642.5	m3	Hardcore	Information provided during workshop, full build-up and specification assumed
Ready-mix concrete, calculated average for United Kingdom, C35/45; C40/50, 35 to 44 MPa (One Click LCA)	642.5	m3	RC35 GF slab 200mm	Information provided during workshop, full build-up and specification assumed
Reinforcement steel bar (rebar), UK average (IStructE (2025))	6.5	m3	Slab reinforcements	Information provided during workshop, full build-up and specification assumed
PIR insulation, calculated average for United Kingdom, L = 0.022-0.03 W/mK, 100 mm, 3.5 kg/m2 (One Click LCA)	481.9	m3	Slab PIR insulation	Information provided during workshop, full build-up and specification assumed
Waterproofing membranes, calculated average for United Kingdom, 1.52 mm, 1.5 kg/m2 (One Click LCA)	3212.51	m2	DPM	Information provided during workshop, full build-up and specification assumed
Screed - Sand cement C25/30 (Future Homes Hub)	224.9	m3	70mm Screed	Information provided during workshop, full build-up and specification assumed
Ready-mix concrete, calculated average for United Kingdom, C35/45; C40/50, 35 to 44 MPa (One Click LCA)	283.5	m3	RC35 Raft foundations	Information provided during workshop, full build-up and specification assumed
Reinforcement steel bar (rebar), UK average (IStructE (2025))	2.84	m3	Raft foundations reinforcements	Information provided during workshop, full build-up and specification assumed
2.1.Frame				
Structural open rolled steel sections, UK average (IStructE (2025))	13114	kg	Steel columns	Information provided during workshop, quantities estimated
Manufactured structural timber, UK average, 100% FSC/PEFC (IStructE)	37.38	m3	Timber columns	Information provided during workshop, quantities estimated
Timber roof truss with steel, 605 kg/m3, Posi Joist (Crendon Timber Engineering Limited)	20081.25	kg	Upper floor Steel and timber posi joists	Information provided during workshop, quantities estimated
Timber roof truss with steel, 605 kg/m3, Posi Joist (Crendon Timber Engineering Limited)	29457.5	kg	Roof Steel and timber posi joists	Information provided during workshop, quantities estimated
Structural open rolled steel sections, UK average (IStructE (2025))	160262	kg	Steel roof beams	Information provided during workshop, quantities estimated
2.2.Upper Floors				
Stone wool insulation panel, R= 1 m2K/W, thickness: 140-180 mm, 1.58 kg/m2, Flexi® 140-180mm (ROCKWOOL A/S)	251.4	m3	Rockwool insulation 200mm	Information provided during workshop, full build-up and specification assumed
Oriented strand board (OSB), calculated average for United Kingdom, 15 mm, 9.45 kg/m2 (One Click LCA)	22.6	m3	Structural OSB floor decking 18mm	Information provided during workshop, full build-up and specification assumed
2.3.Roof				
Insulation from recycled newspaper with mineral inorganic additives, L= 0.038 W/mK, 45 kg/m3, Lambda=0.038 W/(m.K), Climatizer Plus (CIUR a.s.)	914.8	m3	Warmcel cellulose insulation (main building)	Information provided during workshop, full build-up and specification assumed
Wood wool board, R= 0.25 m2K/W, L= 0.095 W/mK, thickness: 25 mm, 12 kg/m2, 480 kg/m3, Lambda=0.095 W/(m.K), Heraklith, Heraklith C, Heraklith Agro (Knauf Insulation)	2287	m2	Wood wool board 15mm (main building)	Information provided during workshop, full build-up and specification assumed
Stone wool insulation panel, R= 1 m2K/W, thickness: 140-180 mm, 1.58 kg/m2, Flexi® 140-180mm (ROCKWOOL A/S)	367.2	m3	Roof Rockwool insulation 300mm (business units)	Information provided during workshop, full build-up and specification assumed
PIR insulation, calculated average for United Kingdom, L = 0.022-0.03 W/mK, 100 mm, 3.5 kg/m2 (One Click LCA)	48.96	m3	Roof PIR 40mm (Business Units)	Information provided during workshop, full build-up and specification assumed
Waterproofing membranes, calculated average for United Kingdom, 1.52 mm, 1.5 kg/m2 (One Click LCA)	3511	m2	Roof DPM	Information provided during workshop, full build-up and specification assumed
Vapour and air membranes, calculated average for United Kingdom, 0.25 mm, 0.22 kg/m2 (One Click LCA)	3511	m2	Roof breather membrane	Information provided during workshop, full build-up and specification assumed
Galvanized steel façade cladding panel, 6.5 kg/m2, 0% recycled content (One Click LCA)	3511	m2	Roof steel cladding	Information provided during workshop, full build-up and specification assumed
Hot-dip galvanized steel sheets, Steel thickness range: 0.4-3.0 mm (0.015-0.12 in), zinc coating: 20 µm (787.4 µin) (0.28kg/m2 / 0.057 lbs/ft2 sheet steel), 0% recycled content (One Click LCA)	175.55	m2	Cladding rails	Information provided during workshop, full build-up and specification assumed
2.4.Stairs and Ramps				
Hot-dip galvanized steel sheets, Steel thickness range: 0.4-3.0 mm (0.015-0.12 in), zinc coating: 20 µm (787.4 µin) (0.28kg/m2 / 0.057 lbs/ft2 sheet steel), 0% recycled content (One Click LCA)	15.8	m2	Metal atrium stair	Build-up and specification assumed
Glass, laminated safety, unfilled, excluding frame, per m2, generic data for United Kingdom, 12 mm total glass, 30 kg/m2, 2500 kg/m3, Generic Construction Data (GCD) (One Click LCA)	31.5	m2	Glass balustrades	Build-up and specification assumed
Precast concrete stairs (Global Cement and Concrete Association)	95.5	m2	Precast concrete stairs - cafe and units	Build-up and specification assumed
Stainless steel handrail, 1.15 kg/m (Inpro)	141	m	Steel handrails - units	Build-up and specification assumed
2.5.External Walls				
Softwood stud, C16, 1.251 kg/m, 370 kg/m3, 12% moisture content, RICS UK baseline dataset (One Click LCA)	4197.6	kg	Community - Timber stud	Information provided during workshop, full build-up and specification assumed
Insulation from recycled newspaper with mineral inorganic additives, L= 0.038 W/mK, 45 kg/m3, Lambda=0.038 W/(m.K), Climatizer Plus (CIUR a.s.)	127.2	m3	Community - warmcel infill 300mm	Information provided during workshop, full build-up and specification assumed
Wood wool board, R= 0.25 m2K/W, L= 0.095 W/mK, thickness: 25 mm, 12 kg/m2, 480 kg/m3, Lambda=0.095 W/(m.K), Heraklith, Heraklith C, Heraklith Agro (Knauf Insulation)	424	m2	Community - woodwool board	Information provided during workshop, full build-up and specification assumed
Waterproofing membranes, calculated average for United Kingdom, 1.52 mm, 1.5 kg/m2 (One Click LCA)	424	m2	Community - DPM	Information provided during workshop, full build-up and specification assumed
Vapour and air membranes, calculated average for United Kingdom, 0.25 mm, 0.22 kg/m2 (One Click LCA)	424	m2	Community - Breather membrane	Information provided during workshop, full build-up and specification assumed
Regular gypsum plasterboard, calculated average for United Kingdom, 12.5 mm, 10 kg/m2 (One Click LCA)	424	m2	Community - plasterboard	Information provided during workshop, full build-up and specification assumed
Plaster (Future Homes Hub)	1.696	m3	Community - skim	Information provided during workshop, full build-up and specification assumed
Lime plasters, calculated average for United Kingdom, 22.57 kg/m2, 15 mm, 0.222 W/mK, Lambda=0.2223333333333334 W/(m.K), Generic Construction Data (GCD) (One Click LCA)	18.35	m2	Community - lime render	Information provided during workshop, full build-up and specification assumed
Timber, average softwood and hardwood, kiln dried, sawn, generic data for United Kingdom, 512 kg/m3, Generic Construction Data (GCD) (One Click LCA)	6.28	m3	Community - timber cladding - rough sawn	Information provided during workshop, full build-up and specification assumed
Galvanised profiled steel sheet, UK average (IStructE (2025))	0.09155	m3	Community - Metal profiled cladding	Information provided during workshop, full build-up and specification assumed
Treated structural sawn timber, battens and planks, calculated average for United Kingdom, 480 kg/m3, 10 mm, Generic Construction Data (GCD) (One Click LCA)	15.71	m2	Community - timber battens	Information provided during workshop, full build-up and specification assumed
Wood wool board, R= 0.25 m2K/W, L= 0.095 W/mK, thickness: 25 mm, 12 kg/m2, 480 kg/m3, Lambda=0.095 W/(m.K), Heraklith, Heraklith C, Heraklith Agro (Knauf Insulation)	117.98	m2	Sports heated - woodwool board	Information provided during workshop, full build-up and specification assumed
Waterproofing membranes, calculated average for United Kingdom, 1.52 mm, 1.5 kg/m2 (One Click LCA)	117.98	m2	Sports heated - DPM	Information provided during workshop, full build-up and specification assumed
Vapour and air membranes, calculated average for United Kingdom, 0.25 mm, 0.22 kg/m2 (One Click LCA)	117.98	m2	Sports heated - Breather membrane	Information provided during workshop, full build-up and specification assumed
Regular gypsum plasterboard, calculated average for United Kingdom, 12.5 mm, 10 kg/m2 (One Click LCA)	117.98	m2	Sports heated - plasterboard	Information provided during workshop, full build-up and specification assumed
Plaster (Future Homes Hub)	0.47	m3	Sports heated - skim	Information provided during workshop, full build-up and specification assumed
Timber, average softwood and hardwood, kiln dried, sawn, generic data for United Kingdom, 512 kg/m3, Generic Construction Data (GCD) (One Click LCA)	2.36	m3	Sports heated - timber cladding - rough sawn	Information provided during workshop, full build-up and specification assumed
Treated structural sawn timber, battens and planks, calculated average for United Kingdom, 480 kg/m3, 10 mm, Generic Construction Data (GCD) (One Click LCA)	5.899	m2	Sports heated - timber battens	Information provided during workshop, full build-up and specification assumed
Galvanized steel stud framing profiles per m2 (air gap included), UD and CD profiles included, wing width: 6 mm, flange width:50 mm, steel thicnkess:0.6 mm (23 gauge), 600 mm spacing, 1.6 kg/m2 (One Click LCA)	117.98	m2	Sports heated - Metal stud	Information provided during workshop, full build-up and specification assumed

PIR insulation, calculated average for United Kingdom, L = 0.022-0.03 W/mK, 100 mm, 3.5 kg/m2 (One Click LCA)	23.596	m2	Sports heated - PIR insulation 200mm	Information provided during workshop, full build-up and specification assumed
Lime plasters, calculated average for United Kingdom, 22.57 kg/m2, 15 mm, 0.222 W/mK, Lambda=0.2223333333333334 W/(m.K), Generic Construction Data (GCD) (One Click LCA)	53.71	m2	Sports unheated - lime render	Information provided during workshop, full build-up and specification assumed
Waterproofing membranes, calculated average for United Kingdom, 1.52 mm, 1.5 kg/m2 (One Click LCA)	381.21	m2	Sports unheated - DPM	Information provided during workshop, full build-up and specification assumed
Vapour and air membranes, calculated average for United Kingdom, 0.25 mm, 0.22 kg/m2 (One Click LCA)	381.21	m2	Sports unheated - Breather membrane	Information provided during workshop, full build-up and specification assumed
Regular gypsum plasterboard, calculated average for United Kingdom, 12.5 mm, 10 kg/m2 (One Click LCA)	381.21	m2	Sports unheated - plasterboard	Information provided during workshop, full build-up and specification assumed
Timber, average softwood and hardwood, kiln dried, sawn, generic data for United Kingdom, 512 kg/m3, Generic Construction Data (GCD) (One Click LCA)	6.12	m3	Sports unheated - timber cladding - rough sawn	Information provided during workshop, full build-up and specification assumed
Galvanised profiled steel sheet, UK average (IStructE (2025))	0.02	m3	Sports unheated - Metal profiled cladding	Information provided during workshop, full build-up and specification assumed
Treated structural sawn timber, battens and planks, calculated average for United Kingdom, 480 kg/m3, 10 mm, Generic Construction Data (GCD) (One Click LCA)	15.3	m2	Sports unheated - timber battens	Information provided during workshop, full build-up and specification assumed
Galvanized steel stud framing profiles per m2 (air gap included), UD and CD profiles included, wing width: 6 mm, flange width:50 mm, steel thicnkess:0.6 mm (23 gauge), 600 mm spacing, 1.6 kg/m2 (One Click LCA)	381.21	m2	Sports unheated - Metal stud	Information provided during workshop, full build-up and specification assumed
PIR insulation, calculated average for United Kingdom, L = 0.022-0.03 W/mK, 100 mm, 3.5 kg/m2 (One Click LCA)	381.21	m2	Sports unheated - PIR insulation 50mm	Information provided during workshop, full build-up and specification assumed
Softwood stud, C16, 1.251 kg/m, 370 kg/m3, 12% moisture content, RICS UK baseline dataset (One Click LCA)	12830	kg	Units - Timber stud	Information provided during workshop, full build-up and specification assumed
Waterproofing membranes, calculated average for United Kingdom, 1.52 mm, 1.5 kg/m2 (One Click LCA)	2592	m2	Units - DPM	Information provided during workshop, full build-up and specification assumed
Regular gypsum plasterboard, calculated average for United Kingdom, 12.5 mm, 10 kg/m2 (One Click LCA)	2592	m2	Units - plasterboard	Information provided during workshop, full build-up and specification assumed
Plaster (Future Homes Hub)	10.368	m3	Units - skim	Information provided during workshop, full build-up and specification assumed
Timber, average softwood and hardwood, kiln dried, sawn, generic data for United Kingdom, 512 kg/m3, Generic Construction Data (GCD) (One Click LCA)	51.84	m3	Units - timber cladding - rough sawn	Information provided during workshop, full build-up and specification assumed
Treated structural sawn timber, battens and planks, calculated average for United Kingdom, 480 kg/m3, 10 mm, Generic Construction Data (GCD) (One Click LCA)	129.6	m2	Units - timber battens	Information provided during workshop, full build-up and specification assumed
PIR insulation, calculated average for United Kingdom, L = 0.022-0.03 W/mK, 100 mm, 3.5 kg/m2 (One Click LCA)	2592	m2	Units - PIR insulation 40mm	Information provided during workshop, full build-up and specification assumed
Stone wool insulation panel, R= 1 m2K/W, thickness: 140-180 mm, 1.58 kg/m2, Flexi® 140-180mm (ROCKWOOL A/S)	2592	m2	Units - rockwool flexi 140mm	Information provided during workshop, full build-up and specification assumed
2.6.Windows and External Doors				
Wood-aluminium top-guided triple-glazed window, Sash thickness: 54 mm, 39.47 kg/m2, VELFAC 200 ENERGY (DOVISTA A/S)	585.34	m2	Main building - Velfac wood/aluminium windows	Information provided during workshop
Wood-aluminium top-guided triple-glazed window, Sash thickness: 54 mm, 39.47 kg/m2, VELFAC 200 ENERGY (DOVISTA A/S)	242	m2	Units - Velfac wood/aluminium windows	Information provided during workshop
Aluminium frame sliding patio door, triple glazed, 0% recycled aluminium, 3 m x 2.18 m, 51.76 kg/m2 (One Click LCA)	24.24	m2	Aluminium glazed sliding doors	Information provided during workshop, specification assumed
Fire-rated and security steel doors, calculated average for United Kingdom, 61.58 kg/m2, Generic Construction Data (GCD) (One Click LCA)	31.58	m2	Fire doors	Information provided during workshop, specification assumed
Steel-framed glazed doors, calculated average for United Kingdom, 68.6 kg/m2, Generic Construction Data (GCD) (One Click LCA)	63.9	m2	Glazed pedestrian doors	Information provided during workshop, specification assumed
Folding door system to achieve large opening width, 223.03 kg/unit, 50 / 50E (KONE)	2	unit	Large sports hall folding doors	Information provided during workshop, specification assumed
Overhead sectional metal door roller shutters, calculated average for United Kingdom, 2.5x2.5 m, 26 kg/m2, 162.5 kg/unit (One Click LCA)	129.6	m2	Unit overhead doors	Information provided during workshop, specification assumed
2.7.Internal Walls				
Softwood stud, C16, 1.251 kg/m, 370 kg/m3, 12% moisture content, RICS UK baseline dataset (One Click LCA)	14868	kg	Heated partition walls - Timber stud	Information provided during workshop, full build-up and specification assumed
Stone wool insulation panel, R= 1 m2K/W, thickness: 140-180 mm, 1.58 kg/m2, Flexi® 140-180mm (ROCKWOOL A/S)	36043	m2	Heated partition walls - rockwool flexi 50mm	Information provided during workshop, full build-up and specification assumed
Regular gypsum plasterboard, calculated average for United Kingdom, 12.5 mm, 10 kg/m2 (One Click LCA)	9010.8	m2	Heated partition walls - plasterboard (2 layers both sides)	Information provided during workshop, full build-up and specification assumed
Plaster (Future Homes Hub)	72.1	m3	Heated partition walls - skim (both sides)	Information provided during workshop, full build-up and specification assumed
Softwood stud, C16, 1.251 kg/m, 370 kg/m3, 12% moisture content, RICS UK baseline dataset (One Click LCA)	4107.8	kg	Unheated partition walls - Timber stud	Information provided during workshop, full build-up and specification assumed
Stone wool insulation panel, R= 1 m2K/W, thickness: 140-180 mm, 1.58 kg/m2, Flexi® 140-180mm (ROCKWOOL A/S)	622.4	m2	Unheated partition walls - rockwool flexi 50mm	Information provided during workshop, full build-up and specification assumed
Regular gypsum plasterboard, calculated average for United Kingdom, 12.5 mm, 10 kg/m2 (One Click LCA)	2489.6	m2	Unheated partition walls - plasterboard (2 layers both sides)	Information provided during workshop, full build-up and specification assumed
Plaster (Future Homes Hub)	5	m3	Unheated partition walls - skim (both sides)	Information provided during workshop, full build-up and specification assumed
2.8.Internal Doors				
Wooden doors, calculated average for United Kingdom, 1.23x2.18 m, 36 kg/m2, 96 kg/unit (One Click LCA)	158.76	m2	Wooden internal doors	Specification assumed
3.1.Wall Finishes				
Porcelain tiles, calculated average for United Kingdom, 10 mm, 22 kg/m2 (One Click LCA)	1252.8	m2	Tiled wall finish - Wet/changing areas	Information provided during workshop, specification assumed
Water-borne paints and coatings, calculated average for United Kingdom, 0.154 mm, 0.2 kg/m2 (One Click LCA)	8380.4	m2	Paint wall finish	Information provided during workshop, specification assumed
3.2.Floor Finishes				
Porcelain tiles, calculated average for United Kingdom, 10 mm, 22 kg/m2 (One Click LCA)	3455.38	m2	Tiled floor finish	Information provided during workshop, specification assumed
3.3.Ceiling Finishes				
Suspended ceiling systems, calculated average for United Kingdom, 6 kg/m2 (One Click LCA)	137.05	m2	Suspended ceiling system grid	Information provided during workshop, specification assumed
Mineral fibre suspended ceiling tiles, calculated average for United Kingdom, 3.55 kg/m2, 17 mm, Generic Construction Data (GCD) (One Click LCA)	2741	m2	Suspended ceiling panels	Information provided during workshop, specification assumed
Wood wool board, R= 0.25 m2K/W, L= 0.095 W/mK, thickness: 25 mm, 12 kg/m2, 480 kg/m3, Lambda=0.095 W/(m.K), Heraklith, Heraklith C, Heraklith Agro (Knauf Insulation)	1444	m2	Warm roof - Wood wool board	Information provided during workshop, specification assumed
Clay plaster with flax fibre, 1300-1500 kg/m3 (One Click LCA)	7508.8	kg	Warm roof - clay plaster	Information provided during workshop, specification assumed

4.Fittings, Furnishings and Equipment				
Wooden lockers and cupboards, 58.1 kg/unit (Bisley)	107	unit	Cupboards	Estimated
Office chair from textile upholstered plywood and steel, 26 kg/unit (One Click LCA)	34	unit	Office chairs	Estimated
High and low kitchen cabinet with door and worktop, 28.83 kg/unit, La présente FDES couvre des meubles de cuisine en fibre de bois mélaminé et plaqué, comprenant un caisson, un plan de travail plein sur la longueur du caisson, un ou deux portes avec poignées, la quincaillerie d'assemblage, quatre pieds et sans plinthe. La robinetterie et le nettoyage pendant la vie en œuvre ne sont pas inclus. Le produit fait l'objet d'un emballage individuel qui est livré à plat sur palette avec 30 autres caissons et plan de travail de cuisine. Nous avons retenu cette configuration d'emballage. L'emballage comprend du carton, du film rétractable, du film étirable et des sacs papiers contenant certaines quincailleries. Les produits de référence sont par exemple : meubles sous-évier, meubles bas et hauts portes, et les gammes promoteurs assimilées à ces références, plusieurs noms commerciaux pouvant être donnés pour une même typologie de meubles. (CHENE VERT)	36	unit	Kitchen worktop	Estimated
Public space chair from plywood and steel, 8 kg/unit (One Click LCA)	140	unit	Chair	Estimated
Low energy efficiency hands-under hand dryer, 6.8 kg/unit, 31 sec drying speed, 2300 W (One Click LCA)	20	unit	Hand dryers	Estimated
Student desk with plywood worktop and steel legs, W: 700 mm, L: 500 mm, 13 kg/unit (One Click LCA)	34	unit	Desks	Estimated
Table with round veneered medium density fibreboard top, diameter: 800 mm, 21 kg/unit (One Click LCA)	35	unit	Tables	Estimated
5.1.1.Sanitaryware				
Ceramic toilet set, 26.93 kg/unit (Ideal Standard International)	22	unit	WC	Estimated
Ceramic wall-mounted bathroom sink, 18.84 kg/unit, GROHE Eurocube Wall-Hung Sink (LIXIL Water Technology)	22	unit	WC sink	Estimated
Stainless steel sink, 5.57 kg/unit, Evier en acier inoxydable [Long. 860 mm Larg. 500 mm Haut. 140 mm] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	12	unit	Kitchen sink	Estimated
Ceramic shower tray, 33.3 kg/unit, 900 × 900 × 80 mm (One Click LCA)	4	unit	Shower tray	Estimated
Mixer Shower, Flow rate: 2.4 gal/min, 1.61 kg/unit, Mira React EV 2.1878.005 (Kohler Co.)	4	unit	Shower	Estimated
Brass tap, 300g, Robinet d´arrêt/de coupure en laiton (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	12	unit	Kitchen taps	Estimated
Brass tap, 300g, Robinet d´arrêt/de coupure en laiton (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	22	unit	WC taps	Estimated
5.Building Systems				
Hybrid ventilation systems with heat recovery, calculated average for United Kingdom, 85 kg per unit, Generic Construction Data (GCD) (One Click LCA)	35	unit	MVHR systems	Estimated
Air extractors, ventilators and fans, calculated average for United Kingdom, 1 kg/unit (One Click LCA)	20	unit	Extract fan	Estimated
Aluminium eggcrate return air grille, 300 x 300 mm (nominal neck size), 0.462 kg/unit (One Click LCA)	100	unit	Extract grille	Estimated
Extruded aluminium double deflection supply air grille, 500 x 150 mm (nominal width x height), 0.78 kg/unit (One Click LCA)	100	unit	Supply grille	Estimated
Ventilation ducts, calculated average for United Kingdom (One Click LCA)	10190	kg	Duct network	Estimated
Water heaters, calculated average for United Kingdom, 40 kg/unit (One Click LCA)	10	unit	Water heaters	Estimated
Sewage water drainage piping network, per m2 GIFA, for office buildings, 0.16 kg/m2 (One Click LCA)	4631.94	m2	Foul drainage network	Based off UK average per m2 GIA
Drinking water supply piping network, per m2 GIFA (office buildings), 0.0765 kg/m2 (One Click LCA)	4631.94	m2	Water pipework	Based off UK average per m2 GIA
Ground source heat pump system, vertical, P=10 kW, 380 kg/unit (One Click LCA)	1	unit	GSHP Borehole	Estimated
Underfloor heating system, 3.2 - 5 cm, 15.95 kg/m2, EcoFloor Plus (INTERPLAST)	1953.91	m2	Underfloor heating	Estimated
Electricity distribution system, cabling and central (switchboards/panelboards), per m2 GFA, for all building types, 3.96 kg/m2 (One Click LCA)	4631.94	m2	Electricity distribution and equipment	Based off UK average per m2 GIA
Glass door fridge, 2060 x 650 x 710 mm (81 x 26 x 28 in), one-door, 500L capacity, 116.7 kg/unit (257.2 lbs/unit) (One Click LCA)	14	unit	Fridge	Estimated
Electric built-in oven, 60 x 60 x 56 cm (24 x 24 x 22 in), 28.42 kg/unit (62.66 lb/unit) (One Click LCA)	2	unit	Oven	Estimated
Electrical switches, sockets and outlets, calculated average for United Kingdom, 0.15 kg/unit (One Click LCA)	450	unit	Sockets	Estimated
Wi-Fi router, Wi-Fi 6/6E/7, dual/tri-band (2.4/5/6 GHz), Gigabit Ethernet, 0.4 kg/unit (One Click LCA)	14	unit	Wifi point	Estimated
Commercial grade dishwasher, 820 x 600 x 650 mm (32 x 24 x 26 in), 25-40 racks/h washing capacity, 70.4 kg/unit (155.3 lbs/unit) (One Click LCA)	3	unit	Dishwasher	Estimated
Upright freezer, capacity: 1295 litres, 180.00 kg/unit, LJ2SA HC R4 (Williams Refrigeration)	3	unit	Freezer	Estimated
Access control panel, 2–8 door capacity, Wiegand/OSDP reader interfaces, NEMA 1 enclosure, 5.8 kg/unit (One Click LCA)	12	unit	Access control	Estimated
LED luminiare, calculated average for United Kingdom, 3 kg/unit (One Click LCA)	450	unit	LED lighting	Estimated
Emergency exit LED light, P=6W, 2.22 kg/unit including packaging	40	unit	Fire exit lights	Estimated
Outdoor decorative light columns, P=36 à 42W, Bornes extérieures décoratives (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	17	unit	External column lights	Estimated
Wall-mounted and industrial LED luminaires, calculated average for United Kingdom, 5.425 kg per unit, Generic Construction Data (GCD) (One Click LCA)	30	unit	External building mounted lights	Estimated
Photovoltaic modules, calculated average for United Kingdom, 19.99 kg per unit, Generic Construction Data (GCD) (One Click LCA)	288	unit	Solar PV	Estimated
Circulation pump, constant pressure, 5.34 kg/unit, Circulateur à eau [40W<P<185W] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	1	unit	Pool circulation pump	Estimated
Reversible water-to-water heat pump with full inverter reciprocating compressor, 310 kg/unit, Titan W Sky Hi HPW R0 3.1 (Swegon Group AB)	1	unit	Pool heat pump	Estimated
Pump control panel enclosure, NEMA 3R or NEMA 4X, 120 VAC control, 230–480 VAC 3-phase, 20.41 kg/unit (One Click LCA)	1	unit	Pool pump control panel	Estimated
8.External Works				
Macadam, 19–26.5 mm, 1680 kg/m3, (version 2026) (One Click LCA)	393	m2	MUGA porous macadam	Estimated from site plan
Water-based and acrylic fire-resistant paints, calculated average for United Kingdom, 1410 kg/m3, Generic Construction Data (GCD) (One Click LCA)	0.0393	m2	MUGA acrylic colour coating 0.1 mm thick	Estimated from site plan
Sand, loose dry density, 1555 kg/m3, (version 2026) (One Click LCA)	577	m2	Brick paving sand	Estimated from site plan
Foldable steel gate, 20.67 kg/m2, 4 x 4.5 m, E+ (AJAB smide AB)	15.5	m2	Steel gates	Estimated from site plan
Treated wood decking, 26.7 kg/m2 (FÉDÉRATION ARBUST)	376	m2	Wood decking	Estimated from site plan
Wooden lean rails, 13.43 kg/m, 2 1/2 in, AW-LR, AW-LRVB (Construction Specialties (CS))	89.2	m	Wood decking rails	Estimated from site plan
Mild steel fencing, 3 mm, 64.73 kg/m, StronGuard MS Base (Barkers Engineering)	83.26	m	MUGA fencing	Estimated from site plan
Mild steel fencing, 3 mm, 64.73 kg/m, StronGuard MS Base (Barkers Engineering)	205.6	m	Perimeter fencing	Estimated from site plan
Granular fill, UK average (IStructE)	822.5	m3	Hardcore	Estimated from site plan
Natural stone paving, calculated average for United Kingdom, 2910 kg/m3, Generic Construction Data (GCD) (One Click LCA)	8.85	m3	Stone paving	Estimated from site plan
Asphalt for roads, 5 % bitumen content, 2360 kg/m3, RICS UK baseline dataset (One Click LCA)	441.18	m3	asphalt	Estimated from site plan
Generic brick, UK average (IStructE)	34.62	m3	Brick paving	Estimated from site plan