Whole Life Carbon Assessment

Artisan Gun Making Workshop Relocation: Ashby Farm

Holland & Holland

P01 13/03/2026

ScotchPartners

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Disclaimer

Contents

1 Executive Summary

1.1 Introduction

Scotch Partners have been instructed by Holland & Holland to conduct a Whole Life Carbon Assessment to determine the emissions associated with the RIBA Stage 2 design of Ashby Farm Artisan Factory Relocation. This is to be submitted to Hillingdon Council in support of the planning application.

The assessment has been undertaken in line with Royal Institution of Chartered Surveyors (RICS) 2nd Edition Whole Life Carbon Assessment For The Built Environment, using the RICS approved software One Click LCA. This report is based upon the RIBA Stage 2 design, largely using information provided from the cost consultant and wider design team. Reasonable assumptions based on industry best practices, were made when data was not available.

The aim of this report is to demonstrate the baseline carbon emissions associated with the development in comparison against Greater London Authority (GLA) Benchmarks. This study follows guidance within the London Plan Guidance: Whole Life-Cycle Carbon Assessments (March 2022).

1.2 Estimated Carbon Emissions

Table 1 – Results

	Upfront Carbon (Module A)	Life Cycle Embodied Carbon (Modules A-C exc. B6-B8)
Non-Decarbonised Scenario	**624** $kgCO_2e/m^2$ GIA	**908** $kgCO_2e/m^2$ GIA
Decarbonised Scenario	**624** $kgCO_2e/m^2$ GIA	**776** $kgCO_2e/m^2$ GIA

This report has set out the estimated Life Cycle Embodied Carbon (Modules A-C exc. B6 & B7; inc. sequestered carbon) for the development to be **908 $kgCO_2e/m^2$ GIA** for the non-decarbonised scenario and **776 $kgCO_2e/m^2$ GIA** for the decarbonised scenario.

In a non-decarbonised scenario, continued reliance on fossil fuels drives high emissions and accelerates climate change. In contrast, a decarbonised future leverages renewable energy, electrification, and carbon capture technologies to reduce emissions and mitigate environmental impacts.

1.3 Carbon Limits

The GLA Benchmarks will guide Upfront Carbon limits and Life Cycle Embodied Carbon limits. For this development, Ashby Farm Artisan Factory Relocation, a retail building typology benchmark has been chosen as the closest building type for benchmarking purposes, as the GLA does not currently publish specific benchmarks for industrial buildings. Retail typologies offer the most comparable typology due to expected operating hours, building scale, form and build up.

1.4 Conclusion

The development is within GLA benchmark limits for Upfront Carbon and Life Cycle Embodied Carbon, though does not meet aspirational benchmarks, and Modules B–C emissions are higher due to the industrial nature and operational requirements of the building. Overall, the project aligns with GLA Whole Life Carbon guidance (London Plan 2021).

2 Introduction

2.1 Development Description

Demolition of the existing site buildings (with central timber framed barn retained), removal of existing hardstanding and menage area and the redevelopment of the site to provide a new high quality workshop facility including associated access improvements, parking, hard and soft landscaping, sustainable drainage and ecological enhancements.

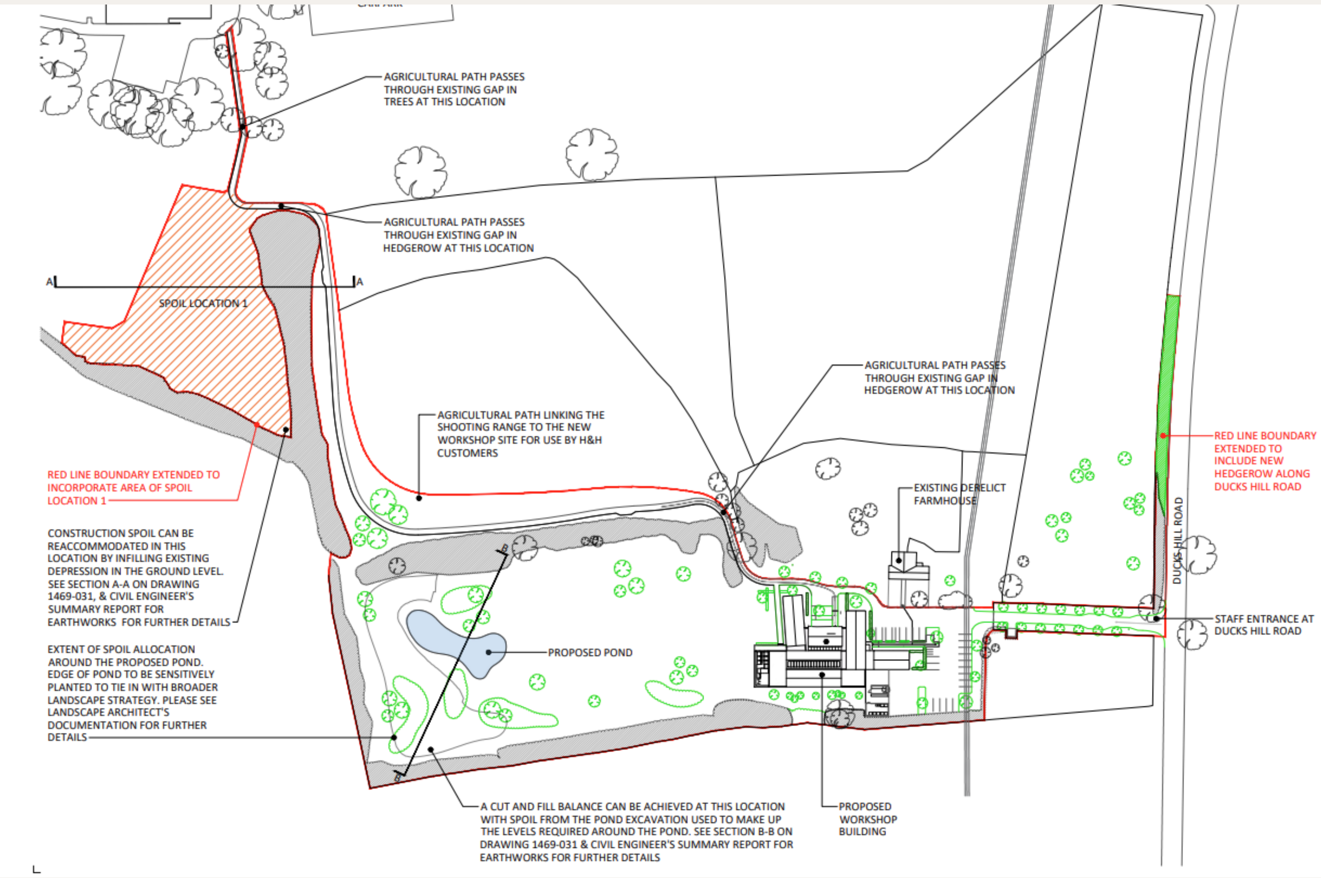

Figure 1 - Proposed Site Master Plan (McDonald Architects drawing number 1469-030, Rev C)

2.2 Background to Whole Life Cycle Assessments

Global climate change is widely considered to be one of the most pressing challenges at a regional, national and international level. Carbon emissions from the operational use of buildings have been the subject of regulation for some time and have historically been the primary focus of reducing the impact of built environment projects. More recently, this focus has been expanded to also include carbon emissions associated with the building materials themselves.

Studies have historically suggested that 10 – 20% of the total carbon emissions for buildings over their lifetime are due to Life Cycle Embodied Carbon. With increasing energy efficiency within buildings and an increasingly decarbonised electricity supply, building operational carbon emission are being acknowledged to be rapidly reducing. As this occurs, the significance of embodied carbon emissions increases and the potential for reduction of overall carbon emissions through structural design choice and material selection becomes greater.

The Whole Life Carbon (WLC) Emissions are those emissions resulting from the construction and use of a building over its entire life, including its demolition and disposal. Calculating the WLC emissions will provide a capture of the buildings operational carbon emissions (from both regulated and unregulated energy use) as well as the embodied carbon emissions.

2.3 RICS Whole Life Carbon

The Royal Institution of Chartered Surveyors (RICS) published the following professional statement: “Whole Life Carbon Assessment for the Built Environment, released in 2017, seeks to standardise WLC assessment and enhance consistency in outputs by providing guidance on implementing the broad appraisal methodology set out in BS EN 15978: Sustainability of Construction Works”. The RICS 1st Edition has since been updated with the 2nd Edition (released September 2023) effective from July 2024. This assessment has been undertaken in line with the RICS 2nd Edition Whole Life Carbon Guidance.

2.4 GLA (Greater London Authority)

The Greater London Authority has established requirements for Whole Life-Cycle Carbon (WLCA) assessments through the London Plan (2021), specifically under Policy SI 2 Minimising greenhouse gas emissions. The accompanying London Plan Guidance document titled Whole Life-Cycle Carbon Assessments March 2022 provides detailed methodology and reporting requirements for referable developments. The guidance aligns with the principles of BS EN 15978 and the RICS Whole Life Carbon framework, ensuring consistency in assessment boundaries, life cycle modules, and reporting format.

Developments are expected not only to quantify emissions but also to demonstrate how carbon reduction has been prioritised through design optimisation, material selection, and construction methodology. The GLA guidance also introduces benchmark targets to assess performance against industry expectations. There is alignment between GLA benchmarks and those published by LETI. While methodologies are closely aligned, LETI benchmarks are often more aspirational, whereas GLA benchmarks form part of the statutory planning process within London.

For this development, Ashby Farm Artisan Factory Relocation, a retail building typology has been chosen as the closest building type for benchmarking purposes, as the GLA does not currently publish specific benchmarks for industrial buildings. Retail typologies offer the most comparable typology due to expected operating hours, building scale, form and build up.

3 Methodology

The assessment of Whole Life Carbon (WLC) Emissions consists of the following sections: Total Operational Carbon Emissions (regulated and unregulated); Life Cycle Embodied Carbon Emissions; and any Future Potential Carbon Emissions 'benefits', Post End-of-Life, including benefits from Reuse and Recycling of building structure and materials.

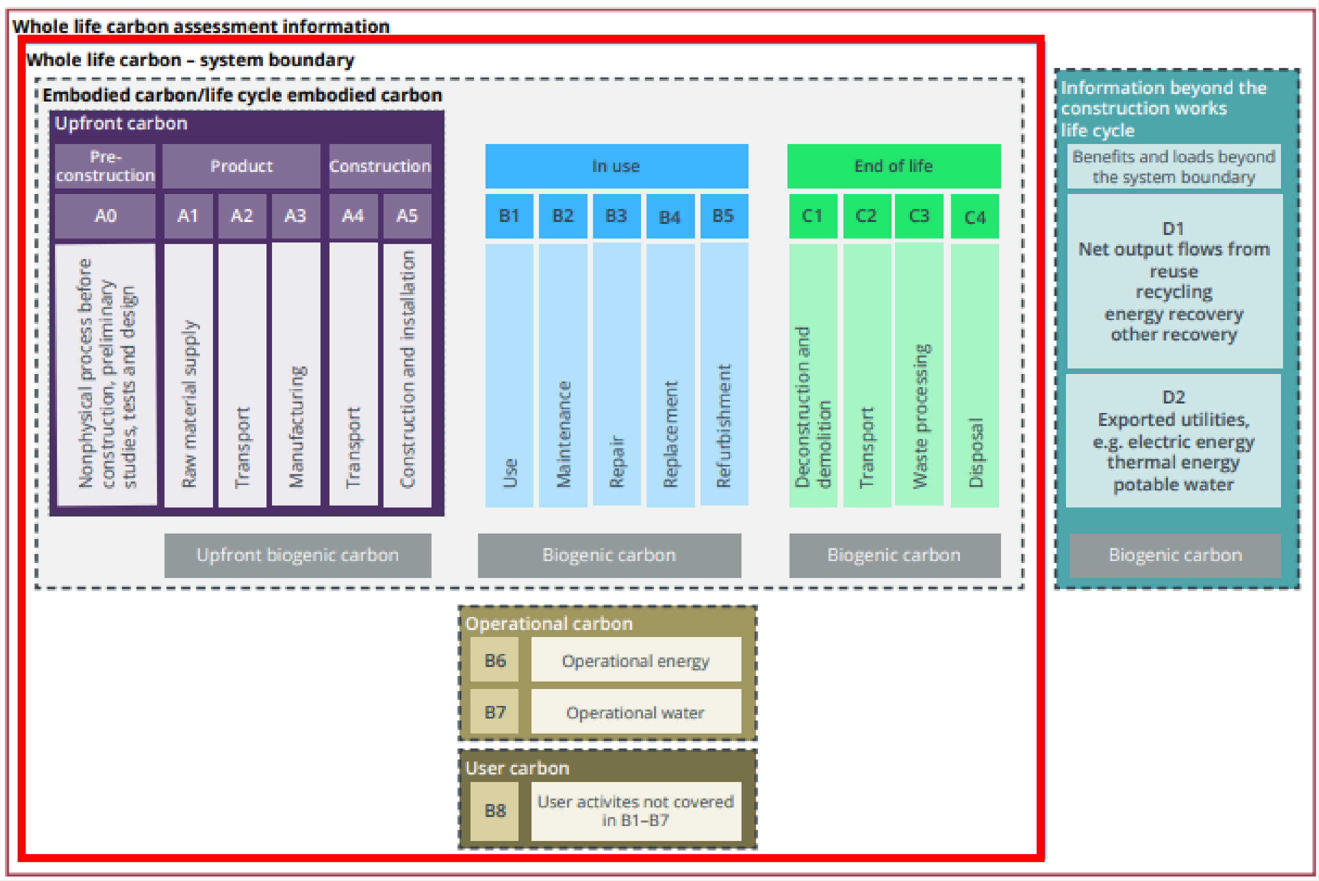

Figure 2 - Building and infrastructure life cycle stages and information modules (UK Net Zero Carbon Buildings Standard)

This WLC assessment was conducted in line with established industry standards specifically the RICS Professional Standard: Whole Life Carbon Assessment for the Built Environment (2nd Edition). The assessment was completed using One Click LCA software.

3.1 Assessment Scope

The key elements of the scope include:

3.1.1 Life Cycle Stages

The WLC assessment covers Modules A-D of life cycle stages as outlined in the RICS 2nd Edition guidance, structured according to BS EN 15978, which includes:

Table 2 - Life Cycle Modules

Module	Scope
A0-A5	Included
B1	Included using manufacturer calculations
B2	Estimated using RICS 2nd Edition guidance, Section 5.2.2
B3	Estimated using RICS 2nd Edition guidance, Section 5.2.3
B4-B5	Included
B6-B8	Included
C1-C4	Included
D1-D2	Included

3.1.2 Project Components

The WLC assessment considers the following project components:

Table 3 - Building Elements

Building Element	Scope	Source
Demolition	Estimated	Cost consultant calculations and One Click LCA templates per m^2 GIA
Facilitating Works	Estimated as part of benchmark	Included in construction site impacts benchmark
Substructure	Included	Structural engineer estimates and cost consultant calculations
Superstructure-Frame	Included	Structural engineer estimates and cost consultant calculations
Superstructure-Upper floors inc balconies	Included	Structural engineer estimates and cost consultant calculations
Superstructure-Roof	Included	Architectural specification and cost consultant calculations
Superstructure-stairs and ramps	Included	Architectural specification and cost consultant calculations
Superstructure-External Walls	Included	Structural engineer calculations, architectural specification and cost consultant calculations
Superstructure-Windows and External Doors	Included	Architectural specification and cost consultant calculations

Superstructure-Internal Walls and Partition	Included	Architectural specification and cost consultant calculations
Superstructure-Internal Doors	Included	Architectural specification and cost consultant calculations
Finishes	Included	Architectural specification and cost consultant calculations
FFE	Included	Architectural specification and cost consultant calculations.
Building Services/MEP	Estimated	MEP specifications where possible, remaining from One Click LCA templates per m^2 GIA. Refrigerant calculations from manufacturers specifications
External Areas	Estimated	Landscape Architectural specification and cost consultant calculations

3.2 Assumptions

The WLC assessment relies on a series of assumptions to estimate carbon emissions across the project's lifecycle. These assumptions are based on industry standards, best practices, and project-specific details, where available. They are critical in determining the accuracy and reliability of the embodied carbon results and have been aligned with the RICS 2nd Edition Whole Life Carbon Assessment guidance.

The key assumptions underlying this assessment are outlined below:

Building Lifespan

The building's operational lifespan is assumed to be 60 years, which is standard for WLC assessments as per RICS guidance. This includes all stages of the building's use, maintenance, and eventual deconstruction.

Material Specifications and Data Sources

Embodied carbon data for materials are derived from industry-standard sources such as the Inventory of Carbon & Energy (ICE) database and Environmental Product Declarations (EPDs).

Where specific product data is unavailable, generic data and assumptions about material types and properties are applied, following guidance from recognized databases and industry norms.

Operational Energy Use

In line with RICS guidance, operational carbon emissions have been provided by the energy assessor. The energy assessor has provided a EUI calculated in line with TM54 methodology.

Operational Water Emissions

The operational water emissions have been based upon assumptions undertaken by the public health engineer.

Maintenance, Repair, and Replacement

Regular maintenance, repair, and replacement cycles for key building components (e.g., HVAC systems, roofing) are assumed based on typical industry practices and the expected lifespan of these components in line with RICS 2nd edition default service life. This has been selected with the LCA parameters within the One Click LCA software.

Module B2 and B3 have been calculated using the RICS and GLA Guidance. B2 uses a benchmark of 10 kgCO_2e/m^2 and B3 uses 2.5 kgCO_2e/m^2.

End-of-Life Scenarios

The end-of-life stage assumes that the building will undergo deconstruction rather than demolition, maximizing the potential for material reuse and recycling in line with circular economy principles.

End-of-Life calculations have used the market scenario calculation default method, with RICS 2nd edition database for country specific end of life scenario's. This has been inputted the LCA parameters within the One Click LCA Scenarios.

Transport and Construction Activities

Transportation distances for materials (from production site to construction site) are assumed based on typical supply chain logistics, with adjustments made for locally sourced materials where applicable. All transportation distances are in line with the RICS 2nd edition distances, and this has been inputted in the LCA parameters in One Click LCA.

Construction site impact has been calculated using the site GIA and the RICS 2nd edition scenario 40kgCO_2e/m^2. The estimated emissions associated with construction site impact is 50 tCO_2e.

Structural Assumptions

Concrete Specifications – information provided by MHA (Structural Engineer):

- Foundations, C20/25
- Blining, C8/10
- Reinforced suspended Ground Floor Slab, C35/40
- Reinforced concrete Frame to Machine Room area (including Slabs and Columns), C32/40
- 25 to 50% GGBS replacement

Reinforcement Estimates – information provided by MHA (Structural Engineer):

- Ground Floor Slab, 110kg/m^3.
- First Floor Slab, 125kg/m^3.
- Columns, 325 kg/m^3.
- Footings and pads, generally unreinforced, with exception of three large central pads to the Machine Shop Area, 70kg/m^3

Material/EPD Selection

Due to stage of design, detailed specifications are not available for some materials. Where material information has been taken from the cost plan, reasonable assumptions have been made relating to thicknesses/weights in line with UK based manufacturer specifications of similar products. These have been selected through comparison with similar projects.

Template/EPD selection with One Click LCA has followed the following hierarchy:

1. Local manufacturer specific data (if known)
2. Local generic data
3. Regional generic data
4. Regional manufacturer specific data
5. Other manufacturer specific data

Contingency

A 15% contingency has been included on all elements as per RICS 2nd Edition Guidance and best industry practice at this stage of the design to allow for any design development and the uncertainty at this stage.

3.2.1 Quality Assurance

This assessment has undergone the following quality assurance checks:

- Internal QA process, including WLC assessor not involved in the project reviewing assessment.
- A 15% contingency buffer has been applied to all results due to the early stage in design to allow scope for material specification at a later stage in design.

3.2.2 Clarifications

Please see below a list of clarifications and assumptions made as part of the methodology for the WLC assessment.

- All results, unless stated, have been generated in One Click LCA software, following RICS 2nd Edition Guidance.
- Structural assumptions have been made in collaboration with the structural consultants on the project, as outlined – MHA.
- Architectural assumptions have been made in collaboration with the lead architectural consultants on the project – McDonald Architects.
- Operational energy carbon figures have been provided by the energy assessor (EEP) using TM54 calculations. For full details on the methodology, please refer to the TM54 report.
- Operational water has been based upon assumptions undertaken by the public health engineer – EEP.
- Material quantities have been provided by the design team and cost consultant.
- Where assumptions were required, reasonable assumptions were made by the design team utilising the One Click software.
- Module B2 and B3 have been calculated using the GLA Guidance for 10 $kgCO_2e/m^2$ for B2 and 25% of B2 for Module B3. This has been distributed in line with the element percentage shares.
- Refrigerant assumptions and Leakage impacts (B1) have been provided by MEP engineer based upon manufacturer information.
- Further MEP Equipment have been calculated EPD Templates provided by One Click in absence of detailed information at this stage.

3.3 Carbon Scenarios

As per RICS 2nd Edition guidance, the results are expressed in terms of the current non-decarbonised scenario, and a potential future decarbonised scenario.

In a non-decarbonised scenario, continued reliance on fossil fuels drives high emissions and accelerates climate change. In contrast, a decarbonised future leverages renewable energy, electrification, and carbon capture technologies to reduce emissions and mitigate environmental impacts.

3.4 Carbon Benchmarks

The results of the WLC assessment will be compared against the GLA Benchmarks. A description of these benchmarks are summarised in Section 2.

Table 4 - WLC Limits

Limits	**Upfront Carbon** (Modules A1-A5) ($kgCO_2e/m^2$)	**Modules B-C** (excluding B6 & B7) ($kgCO_2e/m^2$)	**Life Cycle Embodied Carbon** (Modules A-C, excluding B6 & B7) ($kgCO_2e/m^2$)
GLA Benchmarks*	850	200	1,050
GLA Aspirational Benchmarks*	550	140	690

**based on retail typology – closest category.*

4 Results

This section summarises the results for the development.

4.1 Upfront Carbon Emissions

The upfront carbon emissions for the proposed development include Modules A1-A5. The results of which are displayed in Table 5 below, with breakdowns for each building. Please note, the results are the same for the non-decarbonised and decarbonised scenarios.

Table 5 - Upfront Carbon Results

Module	Module Description	Upfront Carbon Emissions ($kgCO_2e/m^2$)
A1-A3	Product Stages	428
A4	Transport of Equipment and Materials	83
A5	Construction	113
Total		**624**

The results of the assessment displayed a total of **624** $kgCO_2e/m^2$ for the upfront carbon modules. Figure 3 below compares the upfront carbon results against the selected benchmarks.

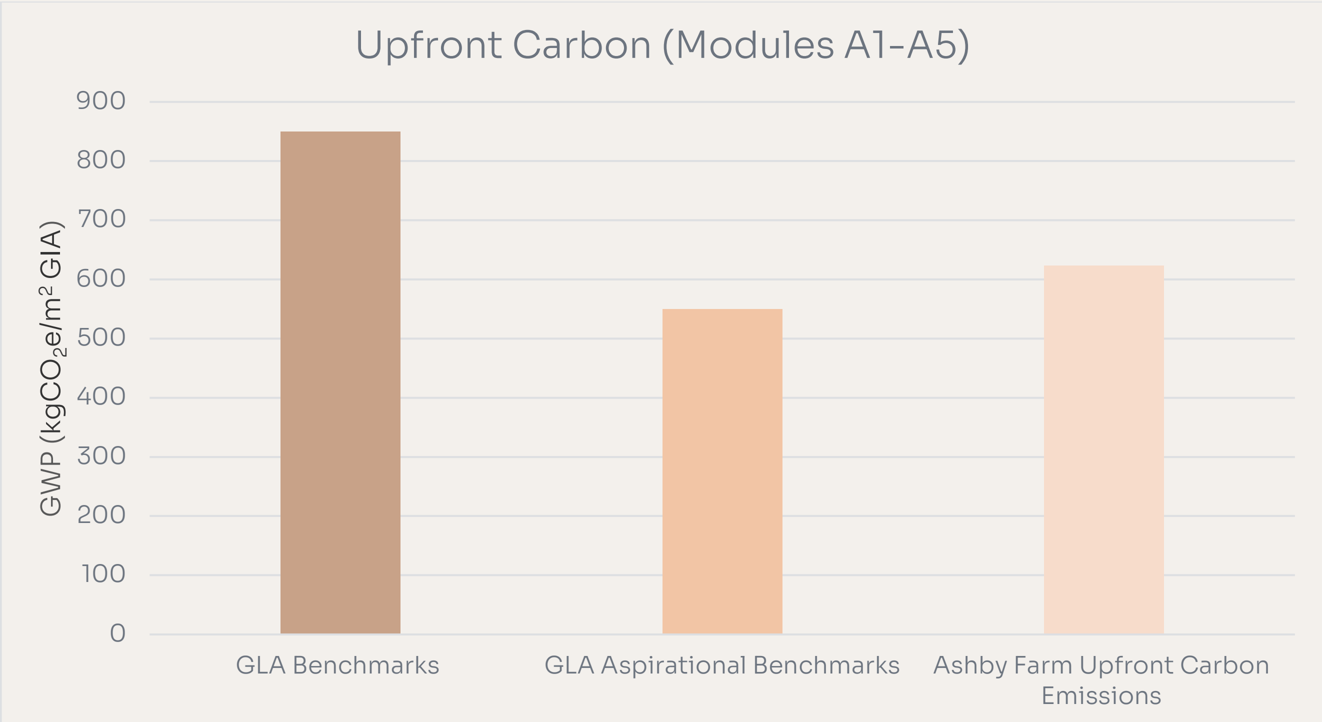

Figure 3 - Upfront Carbon (A1-A5) Comparison Against Benchmarks

4.2 Life Cycle Embodied Carbon Emissions

4.2.1 Non-decarbonised Scenario Results

The Life Cycle Embodied Carbon Emissions for the proposed development include use stages A-C (exc. B6&B7 incl. sequestration). The results of which are displayed in Table 6 below for the non-decarbonised results.

Table 6 – Life Cycle Embodied Carbon Emission Results – Non-Decarbonised Scenario

Module	Module Description	Life Cycle Embodied Carbon Emissions ($kgCO_2e/m^2$)
Sequestration		-128.91
A1-A5	Product Stages	624
B1-B5	In-Use Stages	266
C1-C4	End of Life Stages	147
Total		908

The overall life cycle embodied carbon across the proposed development displays a total of **908** $kgCO_2e/m^2$ GIA for the non-decarbonised scenario.

4.2.2 Decarbonised Scenario Results

The results of the decarbonised scenario are displayed in Table 7 below.

Table 7 - Embodied Carbon Emission Results – Decarbonised Scenario

Module	Module Description	Life Cycle Embodied Carbon Emissions ($kgCO_2e/m^2$)
Sequestration		-128.91
A1-A5	Product Stages	624
B1-B5	In-Use Stages	141
C1-C4	End of Life Stages	140
Total		776

4.2.3 Life Cycle Embodied Carbon Results Comparison

The overall life cycle embodied carbon for the decarbonised scenario across the proposed development displays a total of **776** $kgCO_2e/m^2$ GIA. Figure 4 below compares the selected benchmarks.

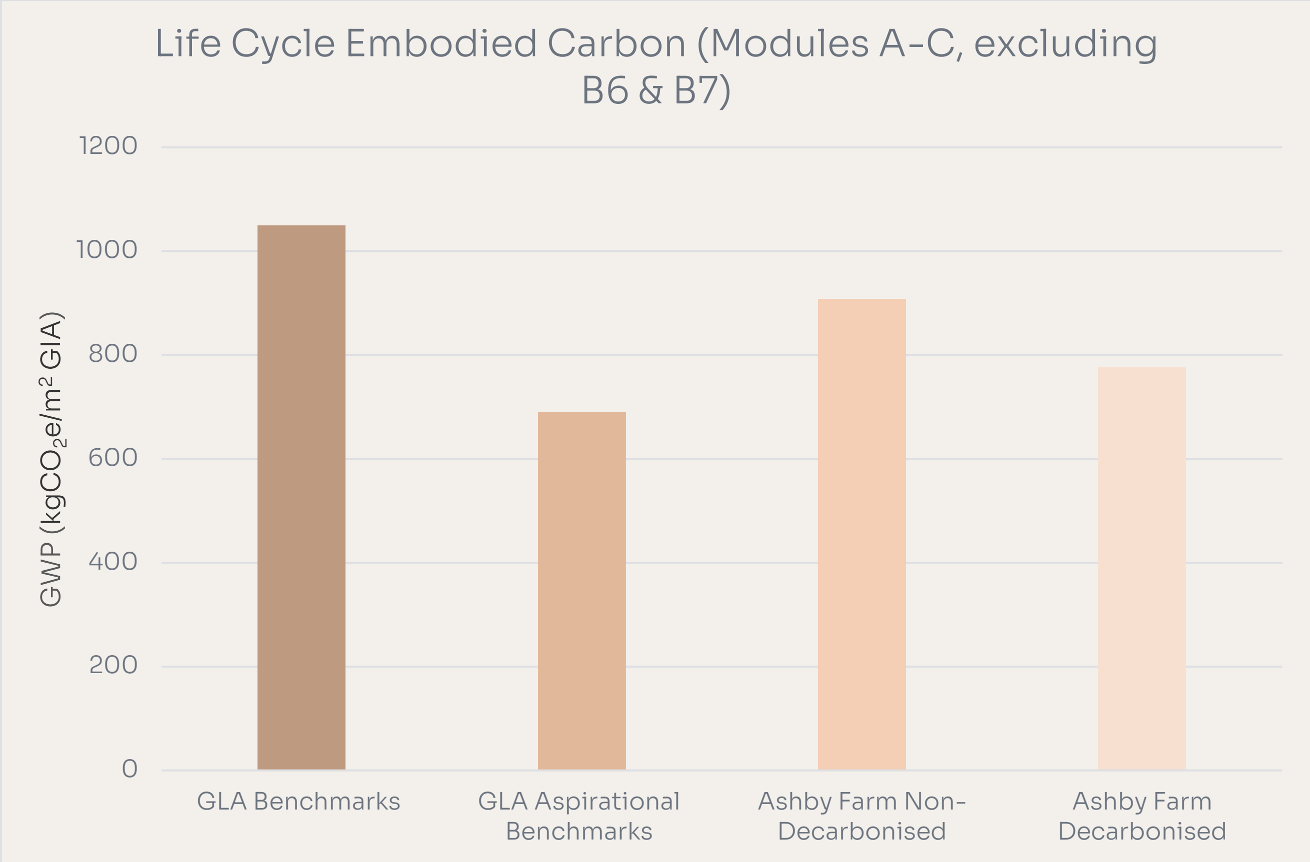

Figure 4 – Life Cycle Embodied Carbon Comparison Against Benchmarks

4.3 Operational Carbon Emissions

The operational carbon emissions for the development are estimated to be **329.96** $kgCO_2e/m^2GIA$ for the non-decarbonised scenario and **97.12** $kgCO_2e/m^2GIA$ for the decarbonised scenario.

Table 8 - Operational Carbon Emissions Results

Module	Non-Decarbonised Scenario ($kgCO_2e/m^2$)	Decarbonised Scenario ($kgCO_2e/m^2$)
Operational Energy	323.51	95.83
Operational Water	6.45	1.29
Total	329.96	97.12

4.4 Estimated Whole Life Carbon Emissions

The assessment generates a total WLC emissions of **1,752,682** kgCO_2e for the non-decarbonised scenario and **1,236,285** kgCO_2e for the decarbonised scenario, as displayed in Table 9 across the various life cycle modules.

Table 9 - WLC Results

Module	Module Description	Non-Decarbonised Scenario (kgCO_2e)	Decarbonised Scenario (kgCO_2e)
A1-A3	Product Stages	605,692	605,692
A4	Transport of Equipment and Materials	117,145	117,145
A5	Construction	160,245	160,245
B1-B5	In-Use	376,935	199,803
B6-B7	Operational Energy and Water	467,221	137,520
C1-C4	End of Life	207,975	198,411
Sequestered Carbon		-182,531	-182,531
Total		**1,752,682**	**1,236,285**
D	Benefits and Loads beyond the System Boundary (not included in totals)	-185,639	-92,848

Figure 5 below displays the whole life carbon emission intensity over the 60-year life of the building. The emission intensity includes annual impacts of operating the building, along with repair and replacement impacts every 15 years.

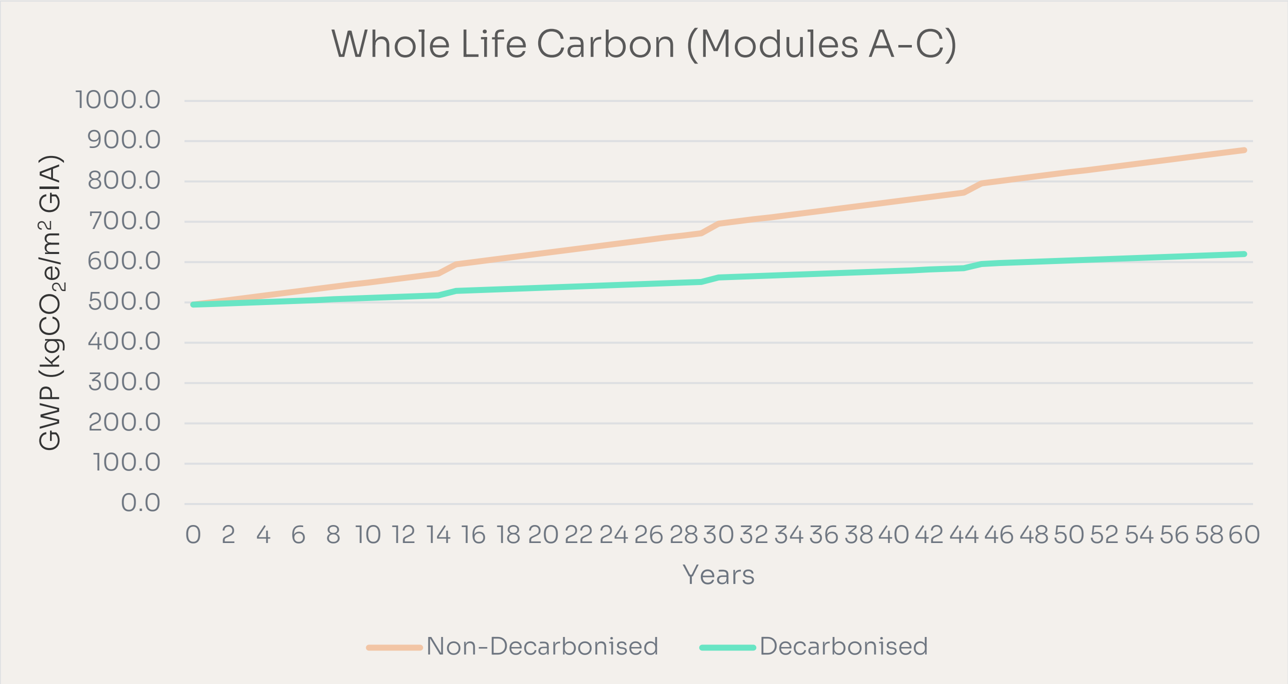

Figure 5 – Whole Life Carbon estimated results per year

4.5 Performance Against Benchmarks

Table 10 below shows the performance of the development against GLA benchmarks and the Stage 2 WLC results. The upfront carbon emissions estimated for the project are within the GLA benchmark limits, although they do not meet the aspirational benchmark values. Additionally, the decarbonised and non-decarbonised life cycle embodied carbon results are within the GLA benchmark limits but exceed the aspirational benchmarks. The decarbonised and non-decarbonised Modules B–C estimated emissions exceed both the GLA benchmark and aspirational limits.

Table 10 - Performance Against Benchmarks

Benchmark	**Upfront Carbon** (Modules A1-A5) ($kgCO^2e/m^2e$ GIA)	**Modules B-C** (excluding B6 & B7) ($kgCO_2e/m^2$)	**Life Cycle Embodied Carbon** (Modules A-C, excluding B6 & B7) ($kgCO^2e/m^2e$ GIA)
Ashby Farm Results – Non-Decarbonised	**624**	**413**	**908**
Ashby Farm Results - Decarbonised	**624**	**281**	**776**
GLA Benchmarks*	850	200	1,050
GLA Aspirational Benchmarks*	550	140	690

**based on retail typology – closest category.*

5 Discussion

5.1 Carbon Limits

The results presented in Section 4 provide insights into the potential carbon emissions associated with the proposed development. These findings show that the Upfront Carbon emissions (Modules A1–A5) estimated for the Ashby Farm Artisan Factory Relocation are within the limits outlined by the GLA benchmarks, although they do not achieve the aspirational benchmark values. Additionally, the decarbonised and non-decarbonised Life Cycle Embodied Carbon (Modules A–C, excluding B6 & B7) results are within the GLA benchmark limits but exceed the aspirational benchmarks. The decarbonised and non-decarbonised Modules B–C estimated emissions exceed both the GLA benchmark and aspirational limits.

This is likely influenced by the industrial nature of the development, which requires durable materials, structural capacity and servicing strategies that can result in higher replacement and maintenance impacts over the building lifecycle. In addition, there are limited building typologies within the GLA carbon benchmarks that are reflective of an industrial facility, and therefore retail buildings were selected as the closest available building type for comparison.

As the Ashby Farm Artisan Factory Relocation building is an industrial facility, it is expected to require additional materials and equipment to ensure appropriate fire safety provisions, high quality indoor air within workshop spaces, and adequate acoustic performance throughout, which may result in higher associated emissions compared to a typical retail building. Furthermore, industrial buildings are generally expected to have higher embodied carbon emissions across several modules due to their specialised functions and operational requirements.

Notably, the use of heavy machinery within the building requires additional structural and foundation support, which further contributes to the overall embodied carbon associated with the development. This is directly reflected in the projects upfront carbon results. Considering the typology, retention of materials, incorporation of natural materials (envelope) and the circularity of the design, the midway carbon scoring for the development is reflective and reasonable.

5.2 Building Element Breakdown

When considering how the emissions are distributed across the various building elements, the substructure contributes the largest share at 25% of the total carbon emissions. This is followed by services, which account for 23% of the overall emissions. The superstructure (frame, upper floor, roof, stairs and ramps) contributes 14%, while external works represent 10% of the total. The façade, internal finishes, and furniture, fittings and equipment (FFE) each contribute a similar proportion, accounting for 9% of the emissions respectively. This distribution is broadly comparable with industry expectations when considered against the closest available typology. Figure 8 provides the building element – percentage breakdown.

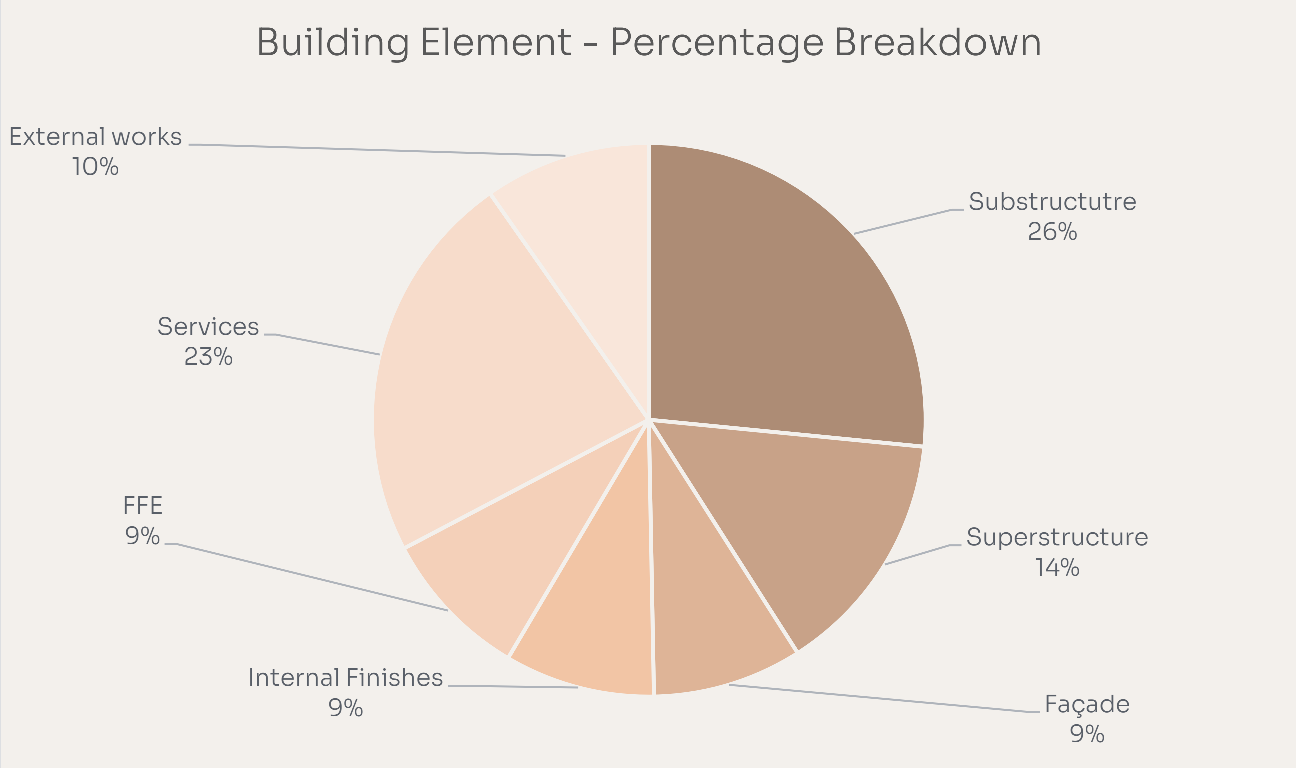

Figure 8 – Building Element – Percentage Breakdown

Following best practice guidance and closest typology published, the Greater London Authority (GLA) confirms that for a typical retail the following breakdown should be close to: substructure at 28%, superstructure at 32%, façade at 11%, internal finishes at 8%, services/MEP at 13%, and external works at 6%.

When compared to this benchmark distribution, several differences can be observed. The substructure contribution (25%) is broadly aligned with the GLA retail typology, although it remains relatively high due to the structural support required for heavy workshop equipment and machinery, including the metal workshop equipment expected to be used within the building. This requires enhanced foundations and base build structural capacity, which increases the embodied carbon associated with the substructure.

The services contribution (23%) is notably higher than the GLA retail benchmark of 13%. This is expected for an industrial workshop facility, where additional servicing is typically required to support operational activities, such as enhanced ventilation and extraction systems, specialist mechanical equipment, and internal environmental controls required to maintain safe and suitable working conditions within workshop spaces.

The external works contribution (10%) is also higher than the GLA retail benchmark of 6%. This is likely influenced by the large external site area associated with the development, which includes landscaping elements, resulting in a greater proportion of embodied carbon associated with external works.

Overall, while some variations are observed when compared with the retail typology, these differences are considered reasonable given the industrial function of the building, which requires greater structural capacity, servicing provision, and external operational space than would typically be expected in a retail development.

5.3 Recommendations

There is opportunity to drive down the emissions associated with the development. To lower the upfront and embodied carbon emissions, the below recommendations should be investigated and incorporated into the design where feasible

- Select equipment and materials with an Environmental Product Declaration (EPD) so that the carbon impact can be accurately reported.
- Review refrigerant specifications to assess options with lower global warming potential (GWP), for example comparing R454B (GWP 491 kg CO_2e/kg) and R32 (GWP 677 kg CO_2e/kg) against R290 (GWP 4 kg CO_2e/kg).
- Ensure the design team engages with the Pre Demolition Audit to assess if reusing the existing buildings framing panels / systems is viable. These opportunities will need to be well defined prior to contractor engagement.
- Explore specifications to understand if steel options with higher recycled content is feasible.
- As a minimum, ensure specifications align with RICS guidance on concrete and steel.
- Maximise cement replacements, where possible, along with water reducing admixtures to reduce the embodied carbon of the frame and foundations.
- Review whether FFE can sourced from material reuse platforms such as Material Index
- Look at further reuse opportunities beyond the reclaimed brick cladding to reduce carbon emissions further.
- Prioritise local suppliers where feasible, ideally within 5–10 km of the site, to reduce transportation-related emissions.
- Incorporate carbon performance requirements into the contractor’s contract, including measures such as site energy metering and reporting, and monitoring of waste generation and diversion rates.

6 Conclusion

This report has outlined the life cycle embodied carbon emissions (Modules A-C exc. B6 & B7; inc. sequestered carbon) estimated for the development to be **908** $kgCO_2e/m^2$GIA for the non-decarbonised scenario and **776** $kgCO_2e/m^2$GIA for the decarbonised scenario. The aim of this report was to ascertain the performance of the development against the GLA Benchmarks for the purpose of supporting the planning application to Hillingdon Council.

The results, as displayed in Section 4, show that the building is within GLA benchmark limits for both Upfront Carbon (Modules A1–A5) and Life Cycle Embodied Carbon (Modules A–C, excluding B6 and B7), although the results do not meet the GLA aspirational benchmarks. The Modules B–C emissions exceed both the GLA benchmark and aspirational limits, which is considered to be influenced by the industrial nature of the development and the specific operational requirements of the building.

Overall, the assessment demonstrates that the development aligns with the requirements of the GLA Whole Life Carbon guidance set out within the London Plan (2021) and follows the recommended methodology for assessing and reporting whole life carbon emissions at this stage of design.

As the design develops, the client and design team will continue reviewing carbon reduction opportunities and implementing carbon recommendations where feasible to further lower the overall life cycle embodied carbon impact of the building. This will include ongoing consideration of material specification, structural efficiency and construction methodologies.

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