Whole Life Carbon Assessment Report

Prepared by Scotch Partners

Submitted on behalf of Lab Selkirk House Ltd

Selkirk House, 166 High Holborn and 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street, London, WC1A 1JR

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Rev 01

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Rev 06

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1 Executive Summary

1.1 Overall Sustainability Objectives and Aspirations

Camden Council and the Mayor of London have declared a 'Climate Emergency' with Camden's declaration including an 'Ecological Emergency'. Both have an aspiration to achieve a Net Zero Carbon borough and city by 2030, 20 years ahead of the national target. In June 2020, Camden approved a 5-year 'Climate Action Plan' which creates a framework for action across all aspects of the borough with the aim of achieving zero carbon by 2030.

Health and wellness are critical social issues and the Camden Health and Wellbeing Strategy 2022-30 is one of the Council's initiatives to improve the health and wellbeing of Camden residents and reduce health inequalities across the borough.

The Applicant and the project team have fully embraced the sustainability and Net Zero Carbon objectives of Camden and the Mayor of London. They are keen for the proposed development to fully support these objectives and to go further by adopting both mandatory and voluntary standards (such as WELL, WiredScore and Net Zero Carbon) in order to maximise longevity, market relevance and social sustainability, and minimise environmental impact over the buildings' life cycle. The intention of the scheme is to act in support of Camden's sustainability aspirations & commitments for the coming years.

Targeting these accreditations ensures the scheme will provide a good balance of proposals, including a focus on both public and private outdoor amenity, a highly-tuned facade providing passive environmental shading and cooling measures, fossil-fuel free heating/cooling and significant contributions to local biodiversity.

The proposed approach to development combines substantive retention of the existing basement and substructure of Selkirk House and replacement new-build above ground. This approach offers the opportunity to achieve cutting-edge environmental performance for the office space that a refurbishment of the existing building cannot match. This in turn, improves performance of the proposed scheme on a life cycle basis.

The proposed development has been designed to also consider the key policies relating to sustainable design and construction, focusing primarily on the following documents:

- Camden Local Plan 2017
- Camden Planning Guidance (CPG) Energy efficiency and adaptation, January 2021
- CPG Planning for Health and Wellbeing, January 2021
- CPG Biodiversity, March 2018
- The London Plan 2021

This Statement forms part of a suite of sustainability documents that collectively demonstrate how the development proposals have responded to both Camden and the Applicant's sustainability objectives, and its performance against mandatory and voluntary sustainability targets. As such, this document should be read in parallel with the following reports submitted with the planning application:

- Sustainability Statement
- Energy Statement
- Circular Economy Statement

1.2 This Report

Scotch Partners LLP have undertaken a Whole Life Carbon (WLC) Assessment for the proposed development of Selkirk House in the London Borough of Camden.

The assessment has been undertaken in line with the GLA Whole Life-Cycle Carbon Assessments guidance, March 2022. This report should be read in conjunction with the GLA Whole Life Carbon Assessment Template issued in Microsoft Excel Format (Appendix A).

The report concludes that the site is estimated to produce emissions in line with the GLA benchmarks set out in the Guidance document.

A Whole Life Carbon Assessment was previously carried out on 30/04/2021 for the previous iteration of the proposals, this assessment has been updated with the current design and latest GLA and RICS methodology. As a result the two assessments are not comparable.

1.3 Estimated Whole Life Carbon Emissions

Table 1 Summary of Whole Life Carbon Emissions

Building Element	Emissions ($kgCO_2e$)
Demolition	941,950
Substructure	3,349,124
Superstructure	21,278,344
Finishes	4,658,913
Services (inc. refrigerant)	12,385,496
External Works	165,326
Operational Energy & Water	18,199010
Site Operations	2,451,464
Total $kgCO_2e$	63,429,627

1.4 Energy Strategy

With an emphasis on the global climate crisis many local authorities (including Camden and the GLA), institutions and businesses have declared a 'Climate Emergency'. There is a growing commitment to achieving Net Zero Carbon (NZC) buildings by 2030, meaning many new developments need to consider now how far they can go to design in features to enable the lowest carbon performance possible.

The energy strategy for the project is a key mechanism for reducing Whole Life Carbon of the development. A passive design strategy has been proposed, which features enhanced fabric elements for the proposed development with consideration for compatibility with the façade design and geometry, construction type and method. For more information, please refer to the Energy Statement submitted with this application.

1.5 Circular Economy

The proposed development has taken care to consider Circular Economy in its design. The Circular Economy statement details the strategy for recovery of materials in line with the circular economy model. For full details please read the full Circular Economy Statement.

1.6 Conclusion

This report has set out the Whole Life Carbon emissions estimated for the site. This follows the GLA Whole Life-Cycle Carbon Assessments guidance, March 2022 and results in embodied carbon and whole life carbon figures that fall within the GLA benchmarks.

2 Introduction

Scotch Partners have prepared this Whole Life Cycle Carbon Assessment on behalf of Lab Selkirk House Ltd, referred to hereafter as "the Applicant", in support of the proposed development of the Selkirk House, 166 High Holborn, 1 Museum Street, 10-12 Museum Street, 35-41 New Oxford Street and 16A-18 West Central Street, and referred to hereafter as "the Site".

The aim of this assessment is to assess the WLC for the Proposed Developments, defined as 'those carbon emissions resulting from the construction and the use of a building over its entire life, including its demolition and disposal.' This assessment captures the operational carbon emissions for the Proposed Development from both regulated and unregulated energy use, as well as its embodied carbon emissions, i.e. those associated with raw material extraction, manufacture and transport of building materials, construction and the emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal.

This report should be read in conjunction with the 'GLA Whole Life Cycle Carbon Assessment Template' issued in Microsoft Excel format.

2.1 Description of Development

2.1.1 Existing Site

The existing site comprises of 0.52 hectares and is bounded by High Holborn to the south, Museum Street to the east and New Oxford Street to the north, with the rear of the properties fronting Grape Street forming the western boundary.

Figure 1 View of existing site from West Central Street

2.1.2 Proposed Development

The proposed development comprises of redevelopment and extension to provide a mixed-use scheme of affordable housing, town centre uses and 22,650m^2 of office floor space within the new 19 storey building on Museum Street. 500 cycle parking spaces to be allocated and a high proportion of open spaces across the site providing a public realm.

Figure 2 Proposed Development from Bloomsbury Way

The proposed development falls within a one red line area and comprises of the following components:

- Museum Street - a single new building rising to 19 storeys, providing office (Class E(g)(i)) accommodation on upper levels and a range of flexible town centre uses (Class E) at ground level.

- High Holborn - a single new building rising to 6 storeys, providing residential (Class C3) accommodation on upper levels and a flexible town centre use (Class E) at ground level.

- Vine Lane - a single new building rising to 5 storeys, providing market residential units with a flexible town centre use (Class E) at ground level. The office (Class E(g)(i)) floorspace within this building will be operated by LABS as a co-working offer.

- West Central Street ¬- a series of new and refurbished buildings rising to 6 storeys, providing residential accommodation (market, LCR and Intermediate) on upper levels (Class C3) and flexible town centre uses (Class E) at ground level.

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. Industrialisation has resulted in the use of refined and unrefined fossil fuels as an energy source and since the start of the industrial revolution, use of fossil fuels and their resultant release of carbon dioxide into the atmosphere has caused an exponential increase in the concentration of carbon dioxide and other pollutants that are generally agreed to result in increasing global average surface temperature.

It is outside the scope of this report to describe the wide-ranging impacts of climate change; however urgent action is required to limit carbon dioxide and limit the impacts of climate change.

Carbon emissions from operational use of buildings has been the subject of regulation for some time and has historically been the primary focus of reducing the impact of built environment projects. More recently, this focus has been expanded to also include carbon emission 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 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 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 week as the embodied carbon emissions.

2.3 RICS Whole Life Carbon

The RICS professional statement: Whole Life Carbon Assessment (WLC) 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 Greater London Authority have adopted the RICS WLC methodology in their guidance methodology for Whole Life Carbon assessment of referable planning applications.

2.4 UK Green Building Council (GBC) Net Zero Carbon

As a response to mainstream scientific consensus on the urgent need to reduce carbon emissions, the UK Government has legislated to achieve Net Zero carbon by 2050. As part of the definition of Net Zero, the UK Green Building Council has developed a Framework Definition that includes embodied carbon emissions, and this definition is widely being used to develop a roadmap to the 2050 Net Zero target. It's worth noting that the UKGBC approach has not set out a methodology for the appraisal of Whole Life Carbon, which is still being developed.

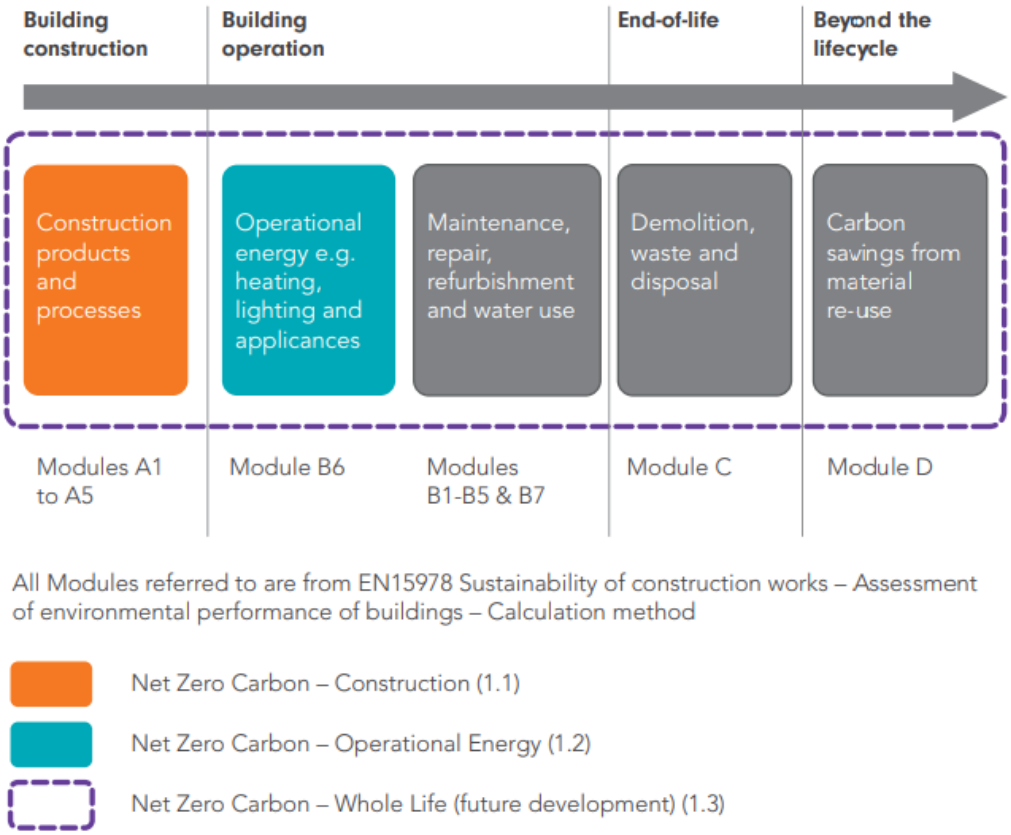

Figure 3 UKGBC Advancing Net Zero Carbon Framework Approach

2.5 The Circular Economy

Currently, the construction industry largely follows a single use "take-make-dispose" model. In order to reduce the negative impact, the industry is having on the environment, and participate in the wider move to long-term sustainable buildings, it is vital the construction industry moves across to a more circular model, in which the value in materials and buildings are both realised and kept in the model for as long as possible.

Full details of the Circular Economy strategy can be found in the accompanying Circular Economy Statement submitted as part of the planning submission.

2.6 Case for Refurbishment

In line with the Waste Hierarchy, first the condition of the existing site must be considered for any opportunities for a refurbishment in order to prevent waste prior to a new building being developed. This approach was considered for the development, with a further study looking into potential retention options prepared separately to this report. This further study will include embodied carbon results for each option.

It is anticipated that all options will demonstrate a level of embodied carbon impact as the retention options appraisal has determined that it would not be feasible to retain the existing building and structure in its entirety. An important factor will also be the age, quality and structural integrity of the existing building. The WLCA will reflect the need for replacement of some original building elements far in advance of any new materials/structure being added, and also the need for structural reinforcement in some

areas, all of which will add embodied carbon. Full details will be provided as part of the report being prepared separately to this application.

The embodied carbon results are part of the larger study looking holistically into the retention options.

2.7 Changes from previous report

A Whole Life Carbon Assessment was previously carried out on 30/04/2021 for the previous iteration of the proposals. The results of this assessment reflect the changes in the design, and results can't be directly compared to the previous report as a result. Comments made against the previous report have also been considered throughout the process to try and give as robust and accurate a report as possible in line with the current RICS methodology and working within the limitations of the software.

The assessment methodology has also changed, with this report using OneClickLCA software. This will result in differences from the original report.

3 Methodology

3.1 Assessment Scope

The assessment of Whole Life Carbon (WLC) emissions consists of the following sections: total operational carbon emissions (regulated plus unregulated); 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.

This assessment has been undertaken in line with the GLA guidance (March 2022) for undertaking WLC Assessments and therefore in line with the RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment.

Operational Carbon Emissions

In line with the GLA guidance, the operational carbon emissions have been calculated based on the Part L assessments undertaken for the Proposed Development as part of the Energy Strategy for planning. This encompasses carbon emissions related to both regulated and unregulated energy uses (in line with Part L definitions), accumulated over a 60-year study period.

Embodied Carbon Assessment and end of life emissions

To assess the embodied carbon for the project a Life Cycle Assessment (LCA) tool – OneClickLCA – has been used to make allocations for the anticipated materials quantities in an inventory analysis. The materials are represented within the model by using materials with associated Environmental Product Declarations (EPDs). EPDs are produced by manufacturers and identify the carbon emissions of a product. By scheduling the materials proposed for the development, the overall carbon emissions can be approximated.

It should be noted here that the LCA tool has a limited database of materials. In the scenario where a specified material isn't included in the database, the most similar material in terms of material composition is selected instead.

In line with standard UK practice, the LCA process and results included by this report have been assessed in line with BS 15978:2011 and the RICS Professional Statement: Whole Life Carbon assessment for the built environment. All EPDs used have been produced in line with the requirements of BS EN 15804:2012. Hence, each material has been assessed against the following lifecycle stage:

- A1-A3: Product stage
- A4: Material transportation to site
- B4-B5: Replacement and maintenance
- C1-C4: End of life

Together with these stages, the contribution of life cycle stage A5 has also been explored separately, giving an estimate of the emissions related to the construction. I.e. the electrical consumption and waste disposal.

In line with the GLA guidance, the assessment includes the following elements:

- Demolition
- Facilitating works
- Substructure
- Superstructure (frame, upper floors, roof, stairs and ramps, external walls, windows and external doors, internal walls and partitions, internal doors)
- Finishes
- Fittings, furnishings and equipment
- Building services
- Prefabricated buildings and building units
- Work to existing building
- External works (hard and soft landscaping, fencing, fixtures, drainage, services)

3.2 Life Cycle Assessment Impacts

A building Life Cycle Assessment considers a range of environmental indicators that assess the relevant overall impacts of the materials selections. Whilst ideally an LCA assessment would consider all environmental factors relevant to the product or material, due to lack of information in some cases, and lack of consensus in how to calculate Key Performance Indicators (KPIs) within the industry, not all environmental impacts can be considered.

Standard ratios are used to convert the various greenhouse gases into equivalent amounts of CO2. These ratios are based on the global warming potential (GWP) of each gas. GWP is a relative measure of how much a given mass of greenhouse gas is estimated to contribute to global warming over a given time interval – usually 100 years. It is expressed relative to carbon dioxide which is set as the baseline which other emitters are compared against, and which therefore has a GWP of 1.

This assessment thus reports on the embodied carbon of the development as 'global warming potential' with the annotation 'CO2 equivalent (CO_2e)'.

3.3 Data Sources

There are a number of approaches to complete a building specific life cycle assessment. In particular, a flexible approach is needed when utilising a dataset of product specific environmental product declarations and more generic data calculated within the LCA tool.

Table 2 Types of data required for a WLC assessment

Quantity Data	Material Data	Comments	Provided by
Cost Plan	Cost Plan	Cost plans can be useful for calculation of uncertain quantities which are not product specific, however often an	Gardiner & Theobald (Cost Consultants)

		allowance is made at early design stages which may reduce accuracy.	
Architectural Drawings and Area Schedule	Architecture Build-up	A more traditional and slower approach to determining quantity of building elements, if build-ups are available to support.	DSDHA Architects (Project Architect) Eckersley O'Callaghan Engineers (Façade)
Structural Drawings and Schedule	Structural Layouts		Meinhardt (Structural Engineers)
Mechanical and Electrical Schedules	M&E Specifications		Scotch Partners (M&E Engineer)

The assessment has utilised multiple data sources described above and is based on the level of detail available at the current stage of design.

The data for these sections has been based on available information provided by the design team. The same construction has been assumed throughout the development. At this stage, detailed drawings were not available for the project.

3.4 Clarifications

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

- This assessment has been done independently from the previous assessment completed due to the changes in design and change in software.
- All results, unless stated, have been provided by OneClickLCA, following RICS and GLA methodology.
- Structural assumptions have been made in collaboration with the structural consultants on the project.
- Architectural assumptions have been made in collaboration with the lead architectural consultants on the project.
- Operational energy carbon figures have been calculated by OneClickLCA and may differ from the results in the energy statement due to different carbon coefficients used. This has been based on figures provided by the relevant SAPs and BRUKL documents.
- Quantities have been provided by the design team and the latest cost plan.
- Where assumptions needed to be made, reasonable assumptions were made by the design team and the OneClick software.

- Contingency (20%) to include coverage included in total figures.
- Demolition based upon GLA 50kgCO2e figure
- Finishes and services have been based on Cat A.

3.5 Benchmarking

The results of the whole life carbon assessment will be compared against the benchmarks highlighted in the GLA Whole Life-Cycle Carbon Assessment Guide (March 2022). Table 3 displays the benchmarks from this document.

Benchmark	Embodied Carbon (Modules A1-A5)	Modules A-C (excluding B6 & B7)
GLA WLC Benchmark	<950 $kgCO_2e/m^2$	<1400 $kgCO_2e/m^2$
GLA WLC Aspirational Benchmark	<600 $kgCO_2e/m^2$	<970 $kgCO_2e/m^2$

Table 3 Guidance GLA WLC 2022 Benchmarks

In addition to the GLA benchmarking, there are other industry accepted benchmarks. For the purpose of this report, these have been displayed in Table 4. These have been taken from the following documents;

- LETI Climate Emergency Design Guide (January, 2020)
- RIBA 2030 Climate Challenge (Version 2, 2021)

Benchmark	Embodied Carbon (Modules A1-A5)	Modules A-C (excluding B6 & B7)
LETI Baseline	1000 $kgCO_2e/m^2$	n/a
LETI 2020	<600 $kgCO_2e/m^2$	n/a
LETI 2030	<350 $kgCO_2e/m^2$	n/a
RIBA Business as usual	n/a	1400 $kgCO_2e/m^2$
RIBA 2025	n/a	<970 $kgCO_2e/m^2$
RIBA 2030	n/a	<750 $kgCO_2e/m^2$

Table 4- Additional Benchmarks

*excluding Cat A

4 Results

4.1 Upfront Embodied Carbon Emissions

The upfront embodied carbon emissions for the proposed development include use stages A1-A5. The results of which are displayed in Table 4 below.

Table 5 Upfront Embodied Carbon Results

Module	Module Description	Totals (KgCO2)
A1-A3	Product Stages	24,035,424
A4	Transport of Equipment and Materials	695,598
A5	Construction	3,480,188
Total		**28,211,210**

The results of the Whole Life Carbon assessment displayed a total of 28,211,210 kg CO2e kgCO2e for the embodied carbon stages. This results in embodied carbon emissions of 807.3 kgCO2e/m2.

4.2 Embodied Carbon Emissions

The embodied carbon emissions for the proposed development include use stages A-C (exc. B6&B7). The results of which are displayed in Table below.

Table 6- Embodied Carbon Emission Results

Module	Module Description	Totals (KgCO2)
A1-A5	Product Stages	28,211,210
B1-B5	Transport of Equipment and Materials	15,514,789
C1-C4	Construction	2,043,438
Sequestered Carbon		-538,819
Total		**45,230,617**

The results of the Whole Life Carbon assessment displayed a total of **45,230,617** $kgCO_2e$ for the embodied carbon stages. This results in embodied carbon emissions of 1294.4 kgCO2e/m2.

4.3 Operational Carbon Emissions

Table 7 Operational Carbon Emissions Results

Category	Totals ($kgCO_2e$)
Operational Energy- Regulated	5,466,072
Operational Energy- Unregulated	10,118,784
Operational Water	2,614,154
Total	**18,199,010**

The Operational Carbon emissions, summarised in Table 7, displays the total operational energy and water emissions are estimated to be 18,199,010 kgCO2e. This results in a figure of 520.8 kgCO2e/m2.

4.4 Estimated Whole Life Carbon (WLC) Emissions

Table 8 WLC Results

Module	Module Description	Totals (KgCO2e)
A1-A3	Product Stages	20,174,493
A4	Transport of Equipment and Materials	579,930
A5	Construction	3,308,734
B1	Use	3,956,040
B3	Repair	1,627,603
B4	Replacement	9,795,460
B6	Operational Energy Use – Regulated	5,466,072
	Operational Energy Use – Unregulated	10,118,784
B7	Operational Water Use	2,614,154
C1	Demolition/Deconstruction	941,950
C2-C4	End of Life	1,102,681
Sequestered Carbon		-538,819
Total		**58,283,912**
D	Benefits and Loads beyond the System Boundary (not included in totals)	- 11,640,716

Assessment 1 resulted in a total WLC emissions of **58,283,912** $kgCO_2e$ as displayed in Table 6. The table displays the breakdown in the different life cycle modules.

5 Opportunities for reducing WLC

5.1 Maximise Recycled Content

By specifying products with high contents of recycled material, the product life cycle emissions can be significantly reduced, compared to products procured with virgin material. Therefore the embodied carbon can be reduced at the technical design stage through choice of materials.

5.2 Influence of Product Specification

The specific requirements of a product can significantly impact the carbon emissions at the product stage, often due the components of the product requiring more carbon intensive treatment and subsequent transportation prior to fabrication.

5.3 Site specific opportunities

Table 9 shows the 6 most contributing materials in terms of cradle to gate emissions (A1-A3). The results of the assessment show the highest contributing material to be structural steel profiles (60% recycled content) at 24.7% of the A1-A3 emissions. The figures displayed provide an opportunity to target the most contributing materials to reduce the overall carbon emissions.

There are further opportunities to increase the recycled content of the concrete and steel elements of the development to further reduce the embodied carbon impacts. Concrete has currently been specified at 30% GGBS with teel varying from 60% for steel profiles and 80% for rebar. Increasing the recycled content can significantly reduce the upfront embodied carbon of both materials.

No	Material	Cradle to gate impacts (A1-A3)	Of cradle to gate (A1-A3)
1	Structural Steel Profiles, 60% recycled content.	4,974 tonnes	24.7%
2	Reinforcement Steel (rebar), 80% recycled content	1,834 tonnes	9.1%
3	Aluminium Curtain Walling (50% glass façade)	1,798 tonnes	8.9%
4	Epoxy Intumescent Coating	1,512 tonnes	7.5%
5	Raised Access Flooring	1,096 tonnes	5.4%
6	Ready-mix Concrete, normal strength, 30%	1,069 tonnes	5.3%

Table 9- Most Contributing Materials

The results also show a higher than expected Module B figure, performing outside the GLA benchmarks. Opportunities to reduce this figure includes prioritising materials with a higher service life. One example of this is the aluminium curtain walling façade, contributing highly to the B4 Replacement figure.

The B1 Use module is also higher than expected at 3,956,040 kgCO2e due to the R32 Refrigerant specified by the manufacturer. This figure could be reduced by limiting the need of refrigerant for the development and specifying less carbon intensive refrigerants.

6 Conclusion

This report has set out the Whole Life Carbon emissions estimated for the Site to be 1294.4 $kgCO_2e/m^2$ (Modules A-C exc. B6 & B7; inc. sequestered carbon). The aim of this report was to ascertain the performance of the Site against the GLA targets as outlined by the Whole Life Carbon Assessment Guidance document (March, 2022).

6.1 Performance against benchmarks

Table 10 Performance against GLA Benchmarks

Indicator	Minimum	Aspiration	Achieved
Embodied Carbon (Modules A1-A5)	<950 $kgCO_2e/m^2$	<600 $kgCO_2e/m^2$	**807.3** $kgCO_2e/m^2$
Modules B-C (exc. B6 & B7) (Office)	<450 $kgCO_2e/m^2$	<370 $kgCO_2e/m^2$	**502.4** $kgCO_2e/m^2$
Modules A-C (exc. B6 & B7; inc. sequestered carbon)	<1400 $kgCO_2e/m^2$	<970 $kgCO_2e/m^2$	**1294.4** $kgCO_2e/m^2$

Table 7 displays the performance of the Site against the GLA benchmarks set out in the WLCA Guidance document (March, 2022). The results show Modules A1-A5 are lower than expected when compared to the GLA benchmarks, this is most probably due to the presence of the West Central Street and High Holborn refurbishments contributing less upfront embodied carbon emissions per GIA when compared to GLA benchmarks for New Builds, as expected. This figure could also be higher than in reality due to the 20% contingency figure placed over the final OneClick results to include coverage.

Module B-C (exc. B6 & B7) is higher than the minimum benchmark, largely due to high replacement emissions for the façade and high refrigerant use. Despite this, the overall figure for Modules A-C (exc. B6 & B7; inc. sequestered carbon) are well within the benchmark set at lower than 1,400 kgCO2e/m2.

6.2 Conclusion

The results of this Whole Life Carbon Assessment show that the Site is currently performs within the benchmarks for the upfront Embodied Carbon (Modules A1-A5), and below the aspirational set out by the GLA Guidance. This will likely be due to the refurbished aspects of the development reducing the upfront carbon.

Although Modules B-C (exc. B6&B7) are outside the minimum benchmarks, the overall A-C (exc. B6&B7: inc. sequestered carbon) are within the benchmarks. Reasons for the higher figures have been explained throughout the report.

The report has highlighted opportunities to further reduce the carbon emissions of the proposed development through increasing recycled content rates of steel, concrete and

other materials, as well as reducing the B module through optimising service life and reducing refrigerant use.

Whilst the results are promising for the development, it should be noted the current results are largely based on best available design information and does include assumptions from the design team where required due to the stage of the project and if more accurate results are needed a further study would be required to reflect any design decisions. The results have also been limited by the use of the OneClickLCA outputs, more detailed embodied carbon can be completed when more accurate design information is available at a later design stage.

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