QODA

Land Adjacent to 46 Maresfield Gardens & 39A Fitzjohn’s Avenue

Whole Life Carbon Assessment

20727-QODA-XX-XX-RP-YS-3001

QODA

Revision Summary

Issue	Document prepared			Document checked		
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QODA

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1 Executive Summary

This Whole Life Carbon Assessment has been prepared in support of The Land Adjacent to 46 Maresfield Gardens and 39A Fitzjohn's Avenue in the London Borough of Camden, hereafter referred to as the Proposed Development. The development will provide residential (Class C3) accommodation, alongside hard and soft landscaping works, boundary treatment works, and other associated works to ensure that occupant wellbeing is prioritised and maximised, whilst establishing the latest and most appropriate Whole Life Carbon principles.

1.1 Context

The LETI Embodied Carbon Primer emphasises that 20% of greenhouse gas emissions in the built environment are linked to embodied carbon, annually. Furthermore, modern projects find that 40-70% of total whole life carbon emissions are linked to embodied carbon. The Greater London Authority (GLA) has established Whole Life Carbon benchmarks based on previous project assessments and cross-referenced these with data from across the industry. These assessments considered whole life embodied carbon, were shell and core, with CAT A finishes, and following the RICS PS in terms of scope of assessment.

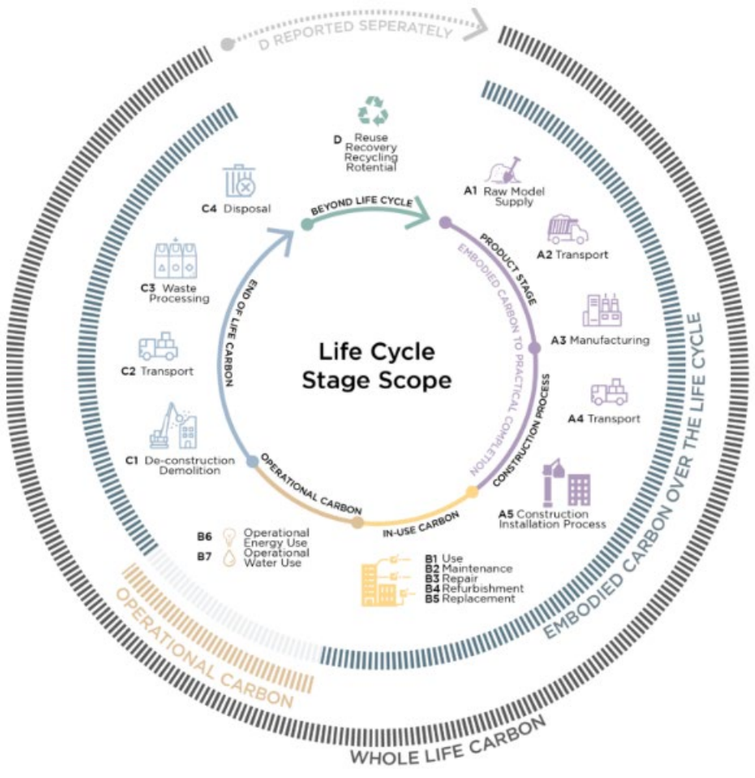

Figure 1 Whole Life Carbon Life Cycle Stage Scope Diagram

1.2 Whole Life Carbon Assessment Scope & Methodology

The WLC assessment has been delivered in line with the following recognised methodologies:

- Greater London Authority guidance for undertaking WLC assessments (March 2022)
- RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment

The RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment guidance is the industry recognised standard for measuring whole life carbon, which ensures that assessments are consistent and fair.

There are several core principles of Whole Life Carbon that should be holistically explored and optimised to reduce a building's carbon footprint. Key principles of the scheme have been detailed below:

- Reuse and retrofit of existing built structures
- Recycled or repurposed materials
- Material selection
- Minimise operational energy use
- Designing for durability and flexibility
- Optimisation of the relationship between operational and embodied carbon
- Building life expectancy
- Local sourcing

Early investigation, supported by the GLA's Whole Life Carbon principles, has indicated that a key design focus should be to design for retrofit and reuse, whilst sourcing local, repurposed or recycling, low-carbon materials.

Principles will be met by reusing existing structures and facades, procuring concrete and steel with high recycled content whilst maintaining structural integrity, challenging suppliers to provide reused products, prioritising UK based suppliers, and minimising operational energy usage.

1.3 Whole Life Carbon Results

Assessment Scope	WLC Benchmark ($kg\ CO_2e/m^2$ GIA)	Aspirational WLC Benchmark ($kg\ CO_2e/m^2$ GIA)	Actual WLC Performance ($kg\ CO_2e/m^2$ GIA)
RICS Module A1-A5 (excluding sequestration)	< 850	< 500	735
RICS Module B-C (excluding B6 & B7 and sequestration)	< 350	< 300	438
RICS Module A-C (excluding B6 & B7, including sequestration)	< 1,200	< 800	1,149

Table 1 GLA Whole Life Carbon Benchmarks and Aspirational Benchmarks, and Actual Whole Life Carbon Performance

2 Introduction

The report demonstrates how the proposed design is in accordance with relevant national, regional, and planning policies in terms of whole life carbon reduction and reporting. It has been produced to document the steps taken to identify and reduce the associated whole life carbon emissions relating to the proposed development. Improvement measures identified in this report relate to the architectural design and construction of the development as well as the proposed building services.

In addition to low carbon design, all proposals for the scheme have been considered with respect to their in-use operation and the effect they may have to users operating and maintaining the building.

2.1 Aims and Objectives

The purpose of this Whole Life Carbon Assessment is to demonstrate that the Proposed Development incorporates carbon reduction measures to comply with applicable carbon related policies set out in section 3.

This report aims to:

- Address the planning requirements associated with whole life carbon;
- Provide information relating to the detailed whole life carbon assessment, and;
- Demonstrate that the whole life carbon principles set out in GLA guidance has been followed.

2.2 Site context

This is a development by 39 Fitzjohns Avenue Ltd and consists of the substantial demolition and redevelopment of 39a Fitzjohns Avenue and the development of Land at Maresfield Gardens to provide residential (Class C3) accommodation, alongside hard and soft landscaping works, boundary treatment works, and other associated works.

The Site is located in Hampstead, in the Frognal and Fitzjohn's ward. It comprises two principal elements, '39a Fitzjohn's Avenue' and 'Land adjacent to 46 Maresfield Gardens'.

The Site is bounded by Fitzjohn's Avenue to the east, Nutley Terrace to the south and Maresfield Gardens to the west. It is located in a predominantly residential area, however owing to its Central London location, the area does include other commercial, and community uses, in close proximity. The area has a pleasant, spacious leafy residential character, albeit located on a significant north-south route.

There are underground constraints to the Site with a tunnel running underneath which forms the London Overground City Thameslink line and there is a ventilation shaft for the tunnel located to the west of the Site.

Space Type	39a Fitzjohn's Avenue	Land Adjacent to Maresfield Gardens
	Nr. Units	Nr. Units
1-bed dwelling	0	8
2-bed dwelling	0	17
3-bed dwelling	2	4
4-bed+ dwelling	2	0
Residential Total	**4**	**29**
Non-residential area	No	Yes
Total GIA (m^2)	1,590	3,081

Table 2 Type and number of properties in the Proposed Development

Figure 2 Site Masterplan, Source: Bowles and Wyer - refer to Design and Access Statement for full detail.

3 Policy Context

3.1 Regional Policy: London Plan March 2021

Figure 3: The London Plan, 2021

The current London Plan, adopted in March 2021 and updated in March 2022, sets out a policy framework to support the delivery of a circular built environment in London. Towards this, Policy SI7 'Reducing waste and supporting the Whole Life Carbon' outlines specific requirements and targets for promoting the adaptation of Whole Life Carbon principles throughout the whole-life cycle of a development. An overview of the policy is outlined below.

<u>POLICY SI7: REDUCING WASTE AND SUPPORTING THE CIRCULAR ECONOMY</u>

Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the mayor, waste planning authorities, and industry working in collaboration to:

1. Promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible.
2. Encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products.
3. Ensure that there is zero biodegradable or recyclable waste to landfill by 2026.
4. Meet or exceed the municipal waste recycling target of 65% by 2030
5. Meet or exceed the targets for each of the following waste and material streams:
   a. Construction and demolition – 95% reuse/recycling/recovery
   b. Excavation – 95% beneficial use
6. Design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

3.2 Local Policy: Camden Planning Guidance

Camden's Local Plan policy CC1 includes the following:

> *"A Whole Life Carbon assessment will be expected for all applications proposing substantial demolition."*

Camden Planning Guidance, Energy Efficiency and Adaptation, January 2021

The London Borough of Camden's Supplementary Planning Guidance was adopted in 2021. The following policies are considered relevant to this Statement:

3.2.2 Energy Efficiency and Adaptation, Chapter 9 Reuse and Optimising Resource Efficiency

KEY MESSAGES
- We will expect creative and innovative solutions to repurposing existing buildings and avoiding demolition where feasible;
- All development should seek to optimise resource efficiency and use circular economy principles.

Supporting information
- Condition and feasibility study, and options appraisal. See paragraphs 9.4 – 9.7. (applies to major redevelopment applications, any development proposing substantial demolition)
- Whole Life Carbon assessment and pre-demolition audit. See paragraphs 9.6 – 9.7. (All applications where the option is substantial demolition)
- Resource efficiency plan. See paragraph 9.10. (All major applications, and new buildings)

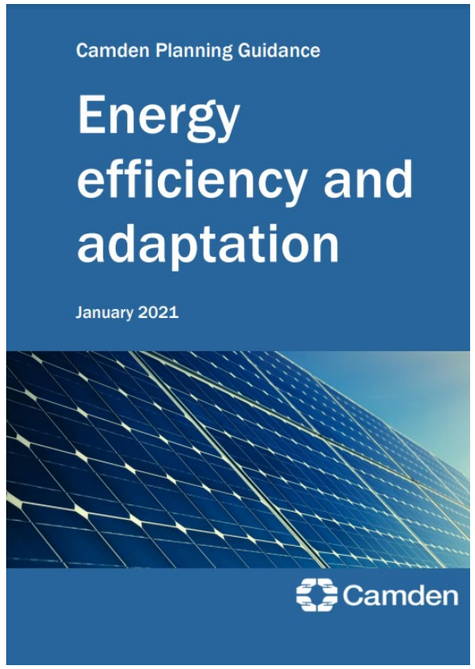

Figure 4: Camden Planning Guidance, 2021

Camden's Energy Efficiency CPG also includes the following:

> *"… a Whole Life Carbon assessment should be submitted, following the GLA SPG and including long term carbon factors."*

> *"We will also require developments [undergoing demolition] to consider the specification of materials and construction processes with low embodied carbon content."*

A Whole Life Carbon Assessment in line with GLA's Guidance is required for 39a Fitzjohn's Avenue, which is undergoing significant demolition. The proposed development will also need to demonstrate that low carbon materials and processes have been considered.

3.3 Method Statement

This section describes the steps for applying the Whole Life Carbon principles and producing this document. This includes a review of the existing and proposed development information, and the meetings and workshops held (including key points, outputs and actions).

Figure 5 below summarises the methodology employed to develop this Draft Whole Life Carbon Assessment.

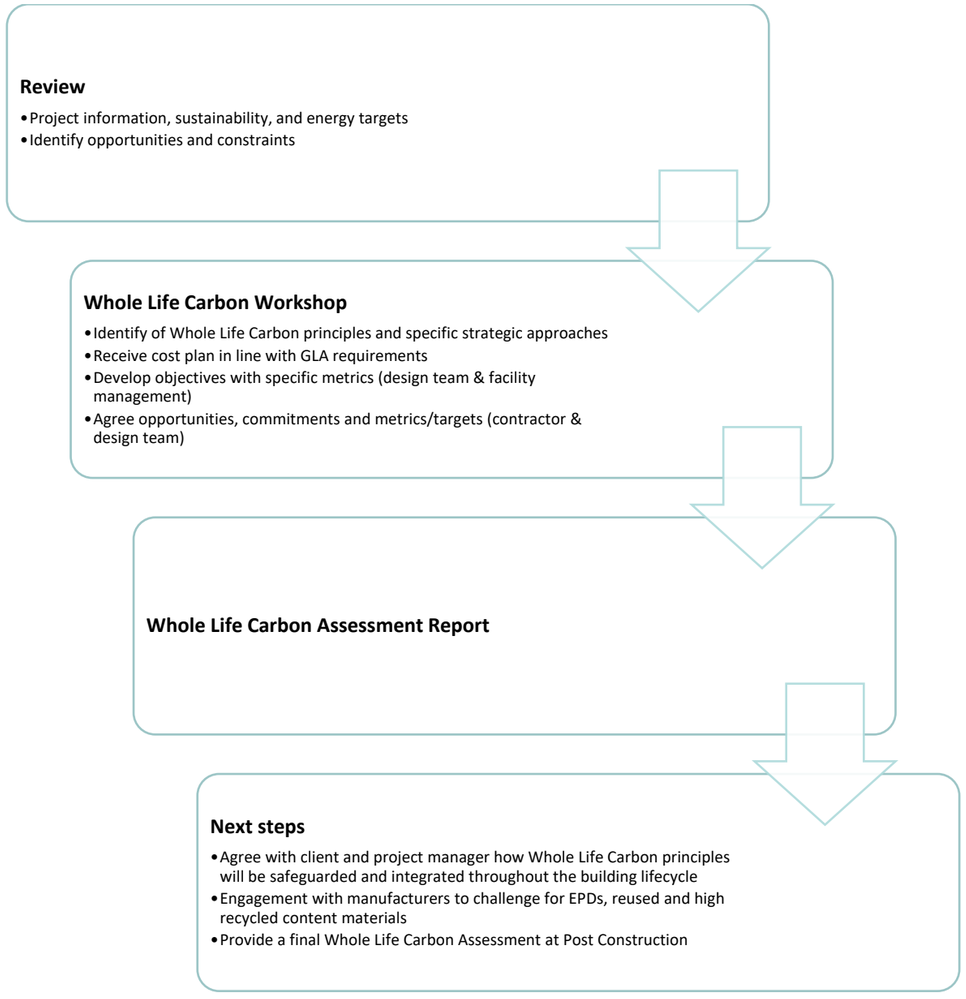

Figure 5: Land Adjacent to 46 Maresfield Gardens & 39A Fitzjohn's Avenue Whole Life Carbon Assessment methodology diagram

Designing buildings to embrace Whole Life Carbon principles is complex and is not yet a widespread design practice. However, the interconnection between various energy and sustainability goals can be a good starting point to drive holistic WLC impacts into building projects.

3.4 Whole Life Carbon Principles

QODA have engaged with the design team to address the WLC principles and specific strategic approaches that should be employed within the scheme.

In order to implement Whole Life Carbon principles most effectively, high-level strategic opportunities have been explored in the early stages before considering specific strategies for adding value during each life cycle stage of the development.

Principle	Applications	Relevant Life-Cycle Modules
Reuse and retrofit of existing built structures	The retention and reuse of existing building at 39a Fitzjohn's Avenue has been explored and maximised at project concept. The existing façade and parts of the existing superstructure are being retained which produces a carbon saving of 31.6 $kgCO_2/m^2$ across the whole development.	A1-A5, B1-B6, C1-C4, D
Recycled or repurposed materials	Demolition contractors have produced a pre-redevelopment audit for 39a Fitzjohn's Avenue which explores the opportunities to repurpose existing materials that are not suitable in current form for the proposed development. Specifications for the proposed development will include requirements to provide an EPD and achieve minimum recycled content targets. Supply chain to be engaged to request opportunities for reused products, local sourcing, and sustainable transport to site.	A1-A5, B1-B5, C1-C4, D
Material selection	Appropriate low carbon material choices are key to carbon reduction. Materials to be procured in line with the planned building life expectancy. Materials will be prioritised that are durable, with low product stage embodied carbon. -	A1-A5, B1-B5, C1-C4, D
Minimise operational energy use	A 'fabric first' approach has been taken to reduce the HVAC demands for the development, and operational energy demand. Low-zero carbon technologies, efficient MEP systems, LED lighting, and PV have been considered to reduce operational energy consumption.	A1-A5, B1-B4, D
Minimise operational water use	Efficient fixtures are being installed to reduce occupant water consumption to 105 L/person/day. Thames Water EPD has been sourced to determine total whole life carbon impact.	A1-A5, B1-B7
Disassembly and reuse	Newly installed building systems such as cladding and structure will be designed for disassembly or dismantlement, as far as reasonably achievable. This will ensure that materials can be reused at end of life instead of being recycled at a lower level.	C1-C4, D
Building shape and form	New build elements have been designed in efficient form to reduce the amount of materials required. Wall-to-floor	A1-A5, B1-B6

	ratio for the new-build design at 46 Maresfield Gardens achieves 1:2 which is used to indicate the building's efficient material design.	
Regenerative design	Green space has been maximised for the development which will provide opportunities for ongoing sequestration. Timber and carpets will act as carbon stores. Exposed concrete will allow for carbonation over the life span of the building.	A1, B1, D
Designing for durability and flexibility	Lightweight, mechanically fixed installations will be prioritised for finishes in the development. Services are accessible so that they are easily maintainable and replaceable. Structural internal partitions have been designed around core areas whereas non-structural partitions will be lightweight by design.	A1-A5, B1-B5, C1-C4, D
Optimisation of the relationship between operational and embodied carbon	The carbon cost of materials has been, and will continue to be, compared against operational energy performance to determine the optimal solution in accordance with whole life carbon. Please see Case for Demolition report, prepared by QODA.	A1-A5, B1-6
Building life expectancy	The building life expectancy has been defined as 60 years, in line with GLA LPG, though the longevity potential of the materials involved means that the building life span is likely to be greater than predicted.	A1-A5, B1-B5, C1-C4, D
Local sourcing	Materials will be sourced from the UK as far as reasonably achievable. Supply chain will be engaged to discover opportunities for local sourcing of materials, as well as sustainable transport delivery to site i.e. electric vehicles, ship from oversees.	A1-A5, B3-B5
Minimising waste	A site waste management plan will be developed by the contractor to ensure the proper minimisation, segregation, and diversion from landfill of all non-hazardous waste on site.	A1-A5, B1-B7, C1-C4, D
Efficient fabrication	Modular systems such as services, precision manufacturing, prefabrication, and modern methods of construction will be prioritised to reduce waste on site.	A1-A5, B1-B7, C1-C4, D
Lightweight construction	Lightweight materials will be specified in non-structural elements to reduce carbon footprint of the building. The sub-structure will be load sized accordingly for additional benefits.	A1-A5, C1-C4, D
Circular economy	Products and materials will be installed that are designed for disassembly, reuse and retrofit, with high recyclability. Suppliers of composite materials will have to be able to provide method statements for future disposal and recycling.	A1-A5, B1-B5, C1-C4, D

Table 3 Whole Life Carbon Principles for the Proposed Development

The whole life carbon reporting template, produced by QODA, goes into greater detail on the items above for each material in each RICS Category.

3.5 Securing commitment to WLC principles

The main focus for the project's next steps is coordination with client and project manager to safeguard Whole Life Carbon principles moving forwards. There will be several ways that the Proposed Development will guarantee adoption of Whole Life Carbon principles throughout design, construction, operation, and end-of-life of the project. The proposed methods being considered are detailed below for each phase:

Design

- Include Whole Life Carbon requirements in specifications;
- Appoint a Whole Life Carbon champion throughout design stages to review and coordinate Whole Life Carbon requirements;
- Early engagement with manufacturers to explore opportunities for low-carbon materials including request for EPDs.

Construction

- Include Whole Life Carbon performance in technical submission;
- Appoint a Whole Life Carbon champion throughout construction stages to manage and coordinate Whole Life Carbon requirements;
- Weekly/monthly provision of actual data highlighting carbon performance of construction works.
- Provide on-site training to principal contractor and sub-contractors to ensure all measures are taken to ensure low-carbon processes are actioned.

Operation

- Provision of training to building owner and building manager;
- Contractual agreement for all building users to retrofit and refurbish areas in line with Circular Economy principles, as well as clearly defined waste agreements;
- All project information stored on a web-based portal and appropriate accessibility for all users.

End-of-Life

- Engagement with Reuse Network to repurpose any surplus materials;
- Disassembly of high value materials, repair, and reinstallation at redevelopment or transfer to alternative local site.

4 Whole Life Carbon Assessment

This chapter outlines the definition of Whole Life Carbon (WLC), the core Whole Life Carbon principles applicable to the built environment and the Proposed Outline Development:

4.1 BS EN 15978: 2011 (Sustainability of Construction Works – Assessment of Environmental Performance of Buildings – Calculation Method) Framework

The WLC assessment has been delivered in line with the following recognised methodologies:

- Greater London Authority guidance for undertaking WLC assessments (March 2022)
- RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment

The RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment guidance is the industry recognised standard for measuring whole life carbon, which ensures that assessments are consistent and fair.

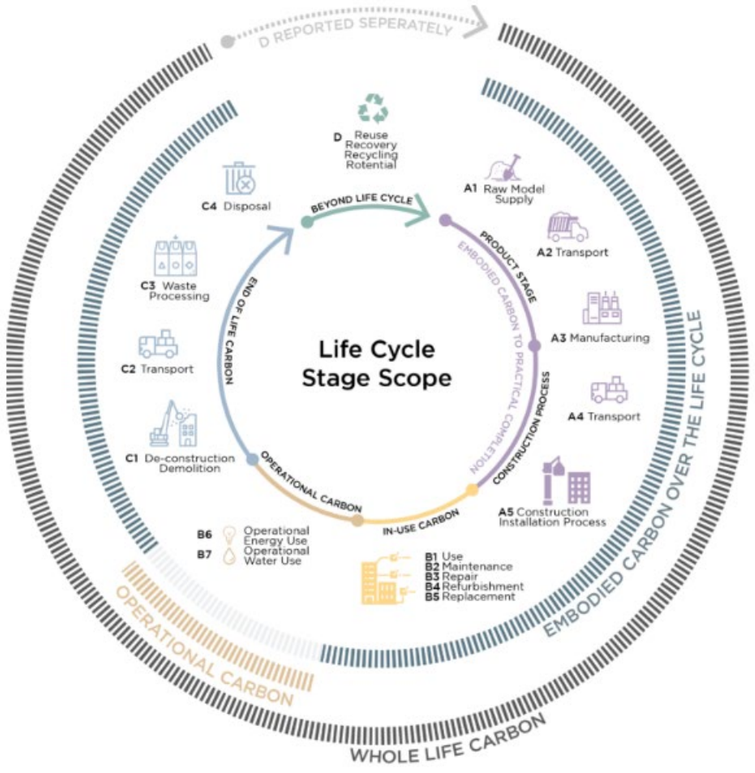

Figure 6: Whole Life Carbon Life Cycle Stage Scope Diagram

4.2 Scope

The WLC assessment has been delivered in accordance with the RICS Professional Statement and consists of reviewing emissions in the following categories:

- Upfront Carbon (embodied carbon emissions) – A1-A5
- In-Use Carbon (carbon emissions associated with use, maintenance, repair, and operation) – B6-B7
- End of Life Carbon (demolition, waste, and disposal) – C1-C4
- Potential Future Carbon Emissions Benefits (circular economy) – D1-D2 (beyond the system boundary of the RICS WLCA)

The development has been assessed in accordance with GLA Whole Life Carbon Assessment Planning Guidance across each life cycle stage.

4.3 Life Cycle Stages in accordance with EN15804:2012

Modules	Life Cycle Stage	Description
A1-A3	Product Stage	Covers the extraction, transportation, and manufacturing processes necessary to produce any construction products, including components and MEP, required to construct the asset.
A4-A5	Construction Stage	Covers transportation of construction products and all construction processes, including wastage, up to project completion. Module A5 also includes any on-site demolition or strip-out works required at the beginning of the project.
B1	In Use Stage	Covers direct emissions and removals from construction products, such as emission of blowing agents from insulation, refrigerant leakage from MEP equipment or removal of CO_2 through carbonation of concrete.
B2-B4	In Use Stage	Covers material-related emissions that occur from maintenance, repair, and replacement of any construction products, components, or elements of asset over the building's life.
B5	In Use Stage	Covers any refurbishment or change in performance of the asset (e.g. retrofit/refurbishment or extension) planned at the outset of the project to occur at some point after construction is completed.
B6	In Use Stage	Covers the energy use of the asset over the in-use stage.
B7	In Use Stage	Covers water use over the in-use stage.
C1-C4	End of Life Stage	Covers impacts during end-of-life stage of an asset. This includes deconstruction or demolition, waste processing, recovery or disposal and associated transport.

D1	Beyond System Boundary	Covers the potential carbon loads and benefits beyond the system boundary from reuse, recycling, energy recovery or landfilling of any materials arising from construction (A4-A5), use (B2-B5) or end of life (C1-C4) stages.
D2	Beyond System Boundary	Covers the potential carbon benefits beyond the system boundary of any utilities exported from the asset during in-use stages B6-B7, such as generated electricity or treated water.

Table 4 Life Cycle Stages Definitions

The WLC assessment covers all building-related elements that are applicable to the project that will be included in the finished area of the completed project, including temporary works. At least 95% of capital cost allocated to each RICS NRM building element category has been accounted for, as evidenced by Anstey Horne. Please see appendix A.

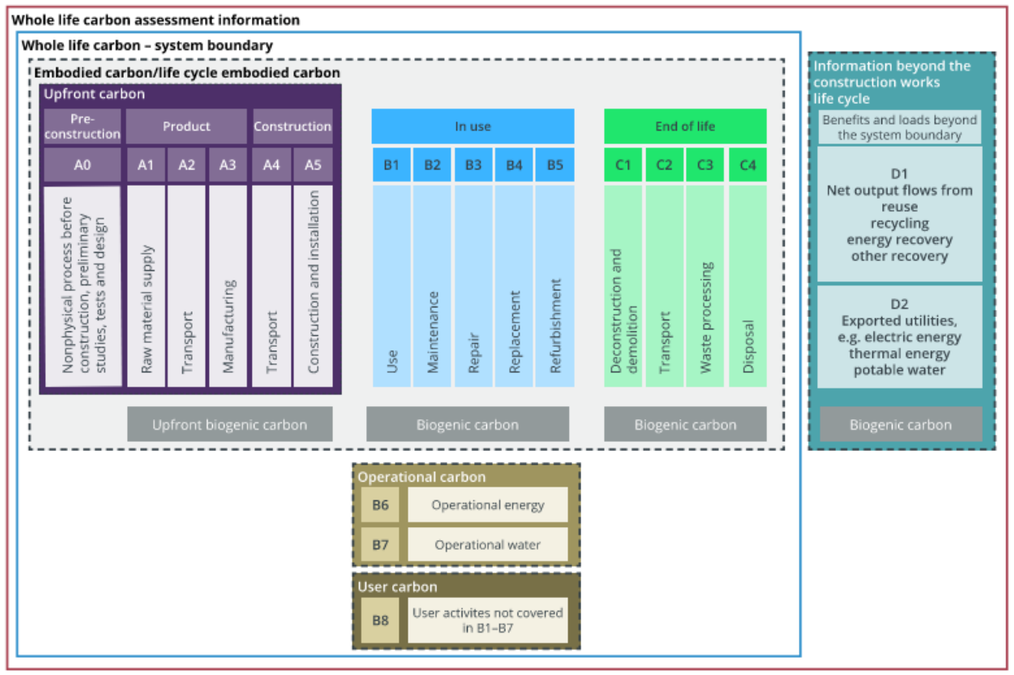

Figure 7: Whole Life Carbon System Boundary

4.4 Tools

The OneClick LCA software has been used, in accordance with GLA WLCA SPG, to conduct the assessment, with the "Whole Life Carbon, GLA / RICS / Green Mark including EN15804 +A2 data" calculation tool used to process carbon emissions results.

4.5 Life Cycle Assessment

The OneClick LCA "Whole Life Carbon, GLA / RICS / Green Mark including EN15804 +A2 data" calculation tool has been used to assess the whole life embodied carbon associated with the development. A bill of materials has been produced in line with the cost plan for the land adjacent to 46 Maresfield Gardens and 39A Fitzjohn's Avenue, which has been used to inform the OneClick LCA model. A schedule of materials and associated EPDs has been developed to produce an output for the carbon footprint of the development. Due to the nature of the design status and uncertainty of supplier, generic EPDs with targeted performance have been preferred to specific EPDs when processing the carbon emissions of each building element. Estimates of emissions for demolition, construction, and waste have been included in the assessment at planning stage and will be updated in line with actual performance at post construction.

4.6 Assessment Data Sources

The following tables detail the assumptions and data sources for the assessment against each of the required element groups and modules.

Modules	Life Cycle Stage	Description	Data Source
A1-A3	Product Stage	Covers the extraction, transportation, and manufacturing processes necessary to produce any construction products, including components and MEP, required to construct the asset.	Calculated with EPDs from OneClick LCA software which align with most applicable generic product.
A4-A5	Construction Stage	Covers transportation of construction products and all construction processes, including wastage, up to project completion. Module A5 also includes any on-site demolition or strip-out works required at the beginning of the project.	OneClick LCA is used to determine transport distances estimated based on typical average transport distances, material type and project location. The software allows for detailed calculations of construction processes, as well as the wastes generated.
B1	In Use Stage	Covers direct emissions and removals from construction products, such as emission of blowing agents from insulation, refrigerant leakage from MEP equipment or removal of CO_2 through carbonation of concrete.	Refrigerant charge has been determined by the MEP consultant.
B2-B4	In Use Stage	Covers material-related emissions that occur from maintenance, repair, and replacement of any construction products, components, or elements of asset over the building's life.	OneClick LCA allows reporting of replacement activities in Module B4 (default LCI sources).

Modules	Life Cycle Stage	Description	Data Source
B5	In Use Stage	Covers any refurbishment or change in performance of the asset (e.g. retrofit/refurbishment or extension) planned at the outset of the project to occur at some point after construction is completed.	OneClick LCA allows reporting of replacement activities in Module B5 (IMPACT LCI sources).
B6	In Use Stage	Covers the energy use of the asset over the in-use stage.	Energy consumption data for regulated and unregulated usage has been taken from QODA's Energy Statement Report.
B7	In Use Stage	Covers water use over the in-use stage.	Water consumption based on Building Regulations Part G 'Enhanced Consumption' of 105 l/p/d and multiplied by the intended full occupancy of development, using EPD for Thames Water.
C1-C4	End of Life Stage	Covers impacts during end-of-life stage of an asset. This includes deconstruction or demolition, waste processing, recovery or disposal and associated transport.	Modules C1-C2 based on default OneClick LCA values. Modules C3-C4 use OneClick LCA integrated end of life scenarios.
D1	Beyond System Boundary	Covers the potential carbon loads and benefits beyond the system boundary from reuse, recycling, energy recovery or landfilling of any materials arising from construction (A4-A5), use (B2-B5) or end of life (C1-C4) stages.	Uses OneClick LCA's integrated end-of-life scenarios.
D2	Beyond System Boundary	Covers the potential carbon benefits beyond the system boundary of any utilities exported from the asset during in-use stages B6-B7, such as generated electricity or treated water.	Exported energy has been taken from QODA's Energy Statement Report.

Table 5 Data Sources for each Life Cycle Stage

5 Whole Life Carbon Results & Commitments

5.1 Whole Life Carbon Assessment Results

A Whole Life Carbon (WLC) Assessment has been carried out in line with London Plan Policy SI2 for the Proposed Development. The OneClick LCA "Whole Life Carbon, GLA / RICS / Green Mark including EN15804 +A2 data" calculation tool has provided the results below:

Assessment Scope	Building Area (m^2)	Whole Life Carbon Emissions ($kg\ CO_2e$)	Whole Life Carbon Emissions by floor area ($kg\ CO_2e/m^2$ GIA)
RICS Module A-C (excluding B6 & B7, including sequestered carbon)	4,671	5,445,495	1,149

Table 6 Whole Life Carbon Results for Life Cycle Module A-C excluding B6 & B7, including sequestration

Modules B6 and B7 are excluded within Table 7 above as they are not part of the scope of the GLA WLC Benchmark comparison. However, further information on Operational Energy Performance and Operational Water Performance can be located within Table 8. The calculations for the regulated and unregulated energy use were completed using QODA's Energy Statement Report. Operational Water Use has been determined using RICS Guidance. Building Regulations Part G 'Enhanced Consumption' figure of 105 l/p/d has been considered and multiplied by the intended full occupancy of development, using EPD for Thames Water. It is considered that each bedroom will host two occupants with a total of 136 occupants across the development.

Assessment Scope	B6 Regulated Energy	B6 Unregulated Energy	B7 Water Use
RICS Module B6 & B7 ($kg\ CO_2e$)	1,014,000	906,000	35,200
RICS Module B6 & B7 ($kg\ CO_2e/m^2$ GIA)	217	194	8

Table 7 Whole Life Carbon Results for Life Cycle Module B6 & B7

Table 9 details the carbon equivalent of each RICS building element group to provide in-depth insight into where the main areas of carbon emissions in the design can be located.

RICS Category	Material Quantity (kg)	Material Intensity (kg/m2)	Whole Life Carbon Emissions ($kg\ CO_2e$)	Whole Life Carbon Emissions ($kg\ CO_2e/m^2$ GIA)	Source of information
0.2 Major Demolition Works	0	0	31,500	7	OneClick LCA
1 Substructure	3,895,337	802	526,839	113	
2.1 Superstructure Frame	49,374	10	84,910	18	
2.2 Superstructure Upper Floors	1,073,398	228	610,189	131	
2.3 Superstructure: Roof	79,980	17	46,670	10	
2.4 Superstructure: Stairs and Ramps	710	0	6,651	1	
2.5 Superstructure: External Walls	4,144,112	847	853,713	183	
2.6 Superstructure: Window and External Doors	65093	14	291,634	62	
2.7 Superstructure: Internal Walls and Partitions	1009397	197	883,996	189	
3 Finishes	605292	115	452,771	97	
4 Fittings, Furnishings, and Equipment	14063	3	140,182	30	
5 Services	39,031	8	2,858,309	612	
8 External Works	363010	77	194,938	42	
Total	**11,338,795**	**2,317**	**7,323,302**	**1,568**	

Table 8 Whole Life Carbon Results for each RICS Building Element Group

5.2 Benchmarks

The GLA has developed WLC benchmarks and aspirational benchmarks, produced by Cundall and Targeting Zero, which have been cross referenced by eTool, OneClick LCA and Hilson Moran. The assessments follow the RICS Professional Standard in terms of scope of assessment, and material assumptions and specifications.

The benchmarks provide a broken-down range of values per life cycle stage. Projects that perform higher than benchmarks are required to examine how WLC emissions can be reduced.

Assessment Scope	WLC Benchmark (kg CO_2e/m^2 GIA)	Aspirational WLC Benchmark (kg CO_2e/m^2 GIA)	Actual WLC Performance (kg CO_2e/m^2 GIA)
RICS Module A1-A5 (excluding sequestration)	< 850	< 500	735
RICS Module B-C (excluding B6 & B7 and sequestration)	< 350	< 300	438
RICS Module A-C (excluding B6 & B7, including sequestration)	< 1,200	< 800	1,149

Table 9 GLA Whole Life Carbon Benchmarks and Aspirational Benchmarks, and Actual Whole Life Carbon Performance

The results in Table 10 show that the project performs better than the GLA's pre-determined benchmark. The results indicate the main area for improvement is RICS Module B-C. This is understandable as a lot of the design needs to be further progressed and there is limited information regarding specific and detailed breakdown of materials.

6 Carbon Emissions Reduction Opportunities

- Appoint a Whole Life Carbon champion to support delivery of Whole Life Carbon design principles;
- Continue to modularize and unitize all design.
- Continue to contact supply chain and challenge them to meet the commitments of the Whole Life Carbon Assessment.
- Specify products with high recycled content / reused materials.
- Procure ASHP with low GWP refrigerant.
- Improve end of life scenario of elemental design.

6.1 Key Commitments

- Tailored to well-defined, long-term needs whilst being durable and resilient or able to cope with change with little modification/no replacement of parts due to design for disassembly, generous proportions and readiness for alternative technologies, different ways of living or working and a changing climate.

- Sustainable and Responsible Procurement: All materials will be sourced as sustainably and responsibly as possible (i.e. Local materials where possible, sustainable timber), EPDs will be requested for all products, recycled content will be requested for all products, reused alternatives will be requested for all products, supplier transport methods to be disclosed for all products.

- Site interventions following the detailed pre-demolition / pre-refurbishment audits, will be implemented.

- Whole Life Carbon opportunities will be monitored throughout the design and construction processes via a Whole Life Carbon champion, and all information will be collated and retained using the Building Passport platform.

- On completion, success against the objectives will be reviewed and an analysis will be undertaken on lessons learnt (whole design team, contractor, and relevant supply chains).

- The development will continue to review its whole life carbon impact throughout the project and will disclose post-construction whole life carbon estimates at this stage.

7 Conclusion

The purpose of this Whole Life Carbon Assessment is to demonstrate that the proposed development at Land Adjacent to 46 Maresfield Gardens & 39A Fitzjohn's Avenue in the London Borough of Camden has considered Whole Life Carbon principles to ensure that the scheme reduces and manages waste in line with GLA recommendations, incorporates low-carbon materials and design for longevity at the heart of design, and provides a robust, adaptable scheme that can be easily disassembled at end-of-life.

The Statement takes into consideration the Whole Life Carbon Hierarchy, with reference to the new London Plan Policy SI7.

The results indicate that the building is performing better than the GLA's benchmark for a residential development. The carbon emissions during RICS Module A1-A5 (cradle to post-construction) outperform the GLA's benchmark. However, the RICS Module B-C (occupant use to end of life) underperform against the GLA benchmark. This is mainly down to lack of reasonable information at early design stages, including unknowns in terms of specific materials and quantities. As the design progresses, the team will work together closely to reduce and mitigate the impact of emissions in-use and at end-of-life. As the whole life carbon assessment progresses, the whole life carbon figures will be negatively impacted due to additional materials being included in the assessment. However, this will be counteracted as the team create more bespoke plans for procurement, maintenance, and end-of-life of each material.

Taking into consideration all the previous sections, it is recommended that the project meets the requirements set for energy and overheating.

8 Summary

Taking into consideration all of the previous sections, it is recommended that the project meets the planning policy requirements set for whole life carbon, including:

- Assessment and reporting of RICS categories 0-8 through RICS modules A-D.
- Whole life carbon reductions achieved for the scheme.
- Whole life carbon reduction opportunities explored for the scheme.

8 Appendix A Cost Plan

39a Fitzjohns Avenue
Bill of Materials Summary - 28th November 2023

Element	Sub-element	Material	Material quantity	Unit	Material Quanity (kg) per unit	Material Quantity (kg)	Material intensity (kg/m2 GIA)	Notes		
Substructure										
	Temporary/permanent works for working space		672	m2		-				No design - Assumed
	Lower ground excavation and disposal to made ground level		2,660	m3		-				No design - Assumed
	Capping beams & contiguous pile wall	Reinforced concrete	228	m3	2500	569,765				Stage 2 design
	RC retaining walls	Reinforced concrete	66	m3	2500	163,778				Stage 2 design
	Raft slab	Reinforced concrete	339	m3	2500	846,250		500mm thick to lower ground floor		Stage 2 design
	Lift pits	Reinforced concrete	13	m3	2500	33,000		Lift pit E/O 6.6m3. (1.2m depth)		No design - Assumed
								Weight assumptions as per Price and Myers email dated		
		Reinforcement to above	69	t				15th November 2023		Stage 2 design
Frame										
	RC shear walls	Reinforced concrete	27	m3	2650	72,115				Stage 2 design
	RC columns	Reinforced concrete	41	m3	2650	109,143				Stage 2 design
	RC downstands/upstands	Reinforced concrete	1	m3	2650	3,015				Stage 2 design
								Weight assumptions as per Price and Myers email dated		
		Reinforcement to above	13	t		-		15th November 2023		Stage 2 design
Upper floors / Stairs										
	Upper floor slabs (inc garden and terrace slabs)	Reinforced concrete	340	m3	2500	849,245				Stage 2 design
	E/O stairs	Reinforced concrete	145	m3	300	43,500		Extra over above		No design - Assumed
								Weight assumptions as per Price and Myers email dated		
		Reinforcement to above	54	t		-		15th November 2023		Stage 2 design
								Weight assumptions as per Price and Myers email dated		
	Structural steel columns and beams	Structural Steelwork	7	t		-		15th November 2024		Stage 2 design
Roof										
	Roof covering	Clay tiles	140	m2		-				Stage 2 design
	Flat roof	Single ply membrane roof	155	m2	220	34,100				Stage 2 design
		Dormers to main roof	13	Nr		-				No design - Assumed
		Dormers (small); Flat roof; timber structure/covering	17	m2		-				No design - Assumed
		Dormers (large); Flat roof; timber structure/covering	20	m2		-				No design - Assumed
		Rainwater installations; generally	292	m2		-				No design - Assumed
		Allowance for plant enclosure	18	m2		-				No design - Assumed
		Allowance for sliding rooflight to ground floor	6	m2		-		Area on plan		No design - Assumed
External walls, windows, and external doors										
	Brickwork cavity wall	Brickwork outer leaf, insulation, blockwork inner leaf	626	m2	220	137,720				Stage 2 design
								At every other floor level, as per stage 2 structural		
	Masonry support	Steel	87	m	35	3,029		sketches		Stage 2 design
	Capping	Aluminium pressed PPC capping	253	m		-				Stage 2 design
	Terrace balustrade	Steel, 1000 high (to terraces)	47	m		-				Stage 2 design
	Thermal lining to retained façade	Timber studs with insulation + insulated plasterboard lining	156	m2		-				Stage 2 design
	Windows and external doors	White painted timber sash windows	239	m2		-				Stage 2 design
	Balcony/terrace doors (quantity included above)	Timber framed, triple glazed						29% of above quantity		
	External doors	Singe doors to residential entrance with fanlight above	3	Nr		-				Stage 2 design
	External doors	Single doors to LGF	2	Nr		-				Stage 2 design
Internal walls										
	Party walls	100mm Rockwool flexi fully-filled cavity	534	m2		-				Stage 2 design
		100mm blockwork either side of rockwool cavity	1,068	m2		-		Blockwork either side hence why 534*2		Stage 2 design
	Internal blockwork walls	140mm dense concrete blockwork	465	m2		-				Stage 2 design
		Two layers of plasterboard either side of the above	1,998	m2		-				Stage 2 design
	Internal partitions	Metal stud	1,008	m2	40	40,320				Stage 2 design
		Isover acoustic partition roll	1,008	m2		-				Stage 2 design
		Two layers of plasterboard either side	2,016	m2		-		Plasterboard both side hence why 1008*2		Stage 2 design
Internal doors										
	Single	Solid veneered internal doors	81	Nr		-			Please declare dimensions of door.	Stage 2 design
	Double	Solid veneered internal doors	11	Nr		-			Please declare dimensions of door.	Stage 2 design
Wall Finishes										
	Tape and joint finish to stud partitions	Plasterboard	4,014	m2	10	40,140				Stage 2 design
	Emulsion	Paint	3,247	m2		-				Stage 2 design
	Tiling finishes	Porcelain tiling	767	m2	39	29,913		35kg/m2 tiles		Stage 2 design
Floor finishes										
	Screed	Floating screed on 40mm rigid insulation	1,590	m2		-				Stage 2 design
	Floor coverings	Tile flooring to entrance hall	66	m2		-				Stage 2 design
		Carpet	775	m2		-				Stage 2 design
		Stone floor tiling	142	m2		-				Stage 2 design
		Engineered timber flooring	315	m2		-				Stage 2 design
		Floor finish to storage and gym - unknown	131	m2		-				No design - Assumed
		Floor finish to plantroom and bike store	48	m2		-		Resin paint assumed		No design - Assumed
	Skirting	Coved skirting to bike and binstores	16	m		-				Stage 2 design
		Hardwood skirting, painted	1,294	m		-				Stage 2 design
		Stone skirting to bathrooms, ensuites, WC's	274	m		-				Stage 2 design
		MDF skirting to plantrooms and gym, painted	114	m		-				Stage 2 design
Ceiling finishes										
		MF plasterboard ceilings	1,590	m2	100	159,000				Stage 2 design
		Extra; moisture resistant to bathrooms and ensuites				-		Extra over costs, quantity captured within ceiling area above		Stage 2 design
		Extra; recessed ceiling detail to kitchen, living, and bedrooms				-		Extra over costs, quantity captured within ceiling area above		Stage 2 design
		Paint	1,590	m2		-				Stage 2 design
		Cornicing	698	m		-				Stage 2 design
Fittings, Furnishings and Equipment										
		Fitted wardrobes to all bedrooms	70	m		-				No design - Assumed
		Vanity units	23	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Bathroom cabinet	23	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Accessories - toilet roll, hooks, holders etc	28	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Kitchens	4	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Window boards; decoration	86	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
Sanitary Appliances										
		Basin	38	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		WC	28	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Shower tray	21	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Shower screen	21	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Bath	2	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
		Bath screen	2	Nr		-			What material(s) and approximate dimensions?	No design - Assumed
Mechanical and Electrical Installations										
		Disposal installations	1,590	m2		-				No design - Assumed
		Water installations	1,590	m2		-				No design - Assumed
		ASHP's	3	Nr		-				No design - Assumed
		Space heating and air conditioning:								No design - Assumed
		Underfloor heating/independent room temperature controls	1,590	m2		-				No design - Assumed
		Heated towel rail to bathrooms, ensuites and WC	28	Nr		-				No design - Assumed
		Ventilation Systems:								No design - Assumed
		Mechanical ventilation system	1,590	m2		-				No design - Assumed
		Electrical installations:								No design - Assumed
		Main LV panels and LV distribution	1,590	m2		-				No design - Assumed
		Electrical metering	4	Nr		-				No design - Assumed
		Containment Systems	1,590	m2		-				No design - Assumed
		Distribution Boards	1	Item		-				No design - Assumed
		Small Power	1,590	m2		-				No design - Assumed
		E/O Sonos sound system to kitchen, living, dining, bedrooms and bathrooms	898	m2		-				No design - Assumed
		Lighting - General & Emergency	1,590	m2		-				No design - Assumed
		E/O motion sensor ambient lighting to bathrooms and ensuites	23	Nr		-				No design - Assumed
		Earthing and Bonding	1,590	m2		-				No design - Assumed
		Fire and Lightning Protection	1,590	m2		-				No design - Assumed
		E/O sprinklers	1,590	m2		-				No design - Assumed
		Communication, Security and Control Systems:								No design - Assumed
		CCTV	1,590	m2		-				No design - Assumed
		Access Control incl video links and handsets	4	Nr		-				No design - Assumed
		Data Cabling incl IT sockets/Telephone sockets	1,590	m2		-				No design - Assumed
		Radio, TV sockets and satellite sockets, connections incl satellite dish, DAB and FM antenna	1,590	m2		-				No design - Assumed
		Allowance for PV panels	75	m2		-				No design - Assumed
External Works										
	Hard landscaping	Clay pavers	250	m2		-				Stage 2 design
		Self binding gravel	62	m2		-				Stage 2 design
		Loose gravel	74	m2		-				Stage 2 design
		Porcelain paving to gardens and front lightwell	173	m2		-				Stage 2 design
		Porcelain paving to terrace	56	m2		-				Stage 2 design
		Stone paving to entrance	26	m2		-				Stage 2 design
		Cladding to lightwell walls	216	m2		-				No design - Assumed
		Soft landscaping	547	m2		-				Stage 2 design
		Trees	55	Nr		-				Stage 2 design
		Allowance for raised planters	26	m2				Area on plan		No design - Assumed
		Allowance for planting to the above	26	m2				Area on plan		No design - Assumed
		Steel Balustrade	125	m		-				Stage 2 design
		Allowance for enclosures to ASHP's	14	m2		-		Area on plan		No design - Assumed
		Brick faced retaining walls	63	m						No design - Assumed
		Allowance for external walls	45	m		-		Notional length		No design - Assumed
		Allowance for pergola	10	m2		-		Area on plan		No design - Assumed
		Allowance for communal binstore	8	m2		-		Area on plan		No design - Assumed
		Allowance for steps	20	m2		-		Area on plan		No design - Assumed
		DRAINAGE								
		Building drainage	1,590	m2		-				No design - Assumed
		Drainage to hard surfacing	585	m2		-				No design - Assumed
								Attenuation volume as per price and myers email dated		
		Attenuation	30	m3		-		4th Dec 2023		Stage 2 design
	External services	Residential Connections	1,590	m2		-				No design - Assumed
		External lighting allowance	585	m2		-				No design - Assumed
						3,134,032	1,971	kg/m2		
					GIA	1,590				

46 Maresfield Gdns
Bill of Materials Summary - 29th November 2023

Element	Sub-element	Material	Material quantity	Unit	Material Quanity (kg) per unit	Material Quantity (kg)	Material intensity (kg/m2 GIA)	Notes	
Substructure									
	Temporary/permanent works for working space		396	m2		-			No design - Assumed
	Lower ground excavation and disposal to made ground level (assumed 60% of LGF footprint)		1,559	m3		-			No design - Assumed
	Capping beams & contiguous pile wall	Reinforced concrete	319	m3	2500	796,344			Stage 2 design
	W2 - 250mm thick RC retaining wall	Reinforced concrete	115	m3	2500	287,569			Stage 2 design
	W3 - 200mm thick RC waterproof liner wall	Reinforced concrete	40	m3	2500	98,814			Stage 2 design
	500mm thick RC raft slab	Reinforced concrete	358	m3	2500	895,000		500mm thick to lower ground floor	Stage 2 design
	Lift pits	Reinforced concrete	13	m3	2500	33,000		Lift pit E/O 6.6m3. (1.2m depth)	No design - Assumed
	750 wide corbel/transfer fin	Reinforced concrete	4	m3		-			Stage 2 design
		Reinforcement to above	92	t		-		Weight assumptions as per Price and Myers email advice for 39a Fitzjohns Avenue	No design - Assumed
	Cavity drainage		716	m2		-			No design - Assumed
Frame									
	W1 - 250mm thick RC wall	Reinforced concrete	252	m3	2650	667,506			Stage 2 design
	C1 - 200 x 800 RC columns	Reinforced concrete	86	m3	2650	227,141			Stage 2 design
	C2 - 250 x 250 RC columns	Reinforced concrete	13	m3	2650	34,089			Stage 2 design
	C4 - 415 x 415 x 200 RC columns	Reinforced concrete	17	m3		-			Stage 2 design
	220w x 470dp RC transfer beam	Reinforced concrete	2	m3		-			Stage 2 design
	150w x 750h RC upstand	Reinforced concrete	9	m3		-			Stage 2 design
	150w x 950h RC upstand	Reinforced concrete	17	m3		-			Stage 2 design
	100w x 150h RC upstand	Reinforced concrete	0.4	m3		-			Stage 2 design
		Reinforcement to above	62	t		-		Weight assumptions as per Price and Myers email advice for 39a Fitzjohns Avenue	No design - Assumed
Upper floors / Stairs									
	RC upper floors; 220mm RC slab	Reinforced concrete	704	m3	2500	1,759,296			Stage 2 design
	450mm thick RC transfer slab	Reinforced concrete	57	m3		-			Stage 2 design
	Allowance for steps in slab	Reinforced concrete	4	m3		-			Stage 2 design
	Staircase LGF to 4th	Reinforced concrete	60	m3		-			No design - Assumed
		Reinforcement to above	98	t		-		Weight assumptions as per Price and Myers email advice for 39a Fitzjohns Avenue	No design - Assumed
	Thermal break	Thermal Break	77	m		-			Stage 2 design
Roof									
	Roof covering - main roof	Bauder extensive green roof and screed to falls	475	m2		-			Stage 2 design
	Roof covering - terraces	Single ply membrane roof to terraces	331	m2		-			Stage 2 design
	Rainwater installations; generally	UPVC	475	m2		-			No design - Assumed
	Mansafe system		116	m		-			No design - Assumed
	Allowance for enclosure to plant	Brickwork	50	m2		-		Notional allowance	No design - Assumed
	Triple glazed rooflight per 4th floor loggia		5	Nr		-		Provisional allowance	No design - Assumed
External walls, windows, and external doors									
	Brickwork cavity wall	Brickwork outer leaf, insulation, blockwork inner leaf	1,419	m2	220	312,180			Stage 2 design
	Masonry support	Steel	416	m	35	14,560			Stage 2 design
	Brickwork to face of parapet	Brickwork	173	m2		-			Stage 2 design
	Brickwork projections to terraces	Assumed brickwork	94	m2		-			Stage 2 design
	Allowance for cladding to columns	Assumed brickwork	336	m2		-			Stage 2 design
	Cills below projecting metalwork	Bespoke pigmented pc cills	282	m		-			Stage 2 design
	Capping to all parapets	Bespoke pigmented pc capping	194	m		-			Stage 2 design
	Terrace soffit	Through coloured render	331	m2		-			Stage 2 design
	Balcony balustrade	Metal balustrade; 1000mm high	138	m		-			Stage 2 design
	Balcony balustrade	Metal balustrade; 380mm high	63	m		-			Stage 2 design
	Juliette balustrade	Metal balustrade; 1000mm high	144	m		-			Stage 2 design
	Windows/screens	Timber framed, triple glazed	665	m2		-			Stage 2 design
	Balcony/terrace doors (quantity included above)	Timber framed, triple glazed		m2		-		48% of above quantity	Stage 2 design
	Solar shading allowance to 50% of windows (improved G-values)		333	m2		-			No design - Assumed
	Door and screen to main entrance	Timber	4	m2		-			Stage 2 design
	Door and screen to ancilliary entrance	Timber	4	m2		-			Stage 2 design
	Double doors to binstore	Steel louvred double doors	4	m2		-			Stage 2 design
Internal walls									
	Party walls: Block	100mm mineral wool fully-filled cavity	1,734	m2		-			Stage 2 design
		100mm blockwork either side of rockwool cavity	3,468	m2		-		Blockwork either side hence why 1734*2	Stage 2 design
	Metal stud partitions	Metal stud	1,924	m2		-			Stage 2 design
		50mm IsoWool to cavity	1,924	m2		-			Stage 2 design
		Plasterboard either side	3,847	m2		-		Plasterboard both side hence why 687*2	Stage 2 design
Internal Doors									
	Apartment entrance doors	54mm solid core; bronze ironmongery by Allgood	29	Nr		-			Stage 2 design
	Single doors	44mm solid core timber doors; bronze ironmomgery by Allgood	108	Nr		-			Stage 2 design
	Door and a half	Timber glazed door	20	Nr		-			Stage 2 design
	Riser doors; double		12	Nr		-			Stage 2 design
	Riser doors; single		12	Nr		-			Stage 2 design
	Communal doors; single		34	Nr		-			Stage 2 design
	Communal doors; door and a half		5	Nr		-			Stage 2 design
Wall Finishes									
	Plaster skim to internal face of external wall, party walls and stud partitions		8,734	m2	10	87,342			Stage 2 design
	Emulsion	Paint	7,460	m2		-			Stage 2 design
	Full height wall tiling to bathrooms, ensuites and WC's	Johnson Prismatics range (apartments and concierge)	1,274	m2		-			Stage 2 design
	Ancilliary residential					-			
	Tape & joint, plus emulsion		225	m2		-			No design - Assumed
	Full height wall tiling to WC's	Johnson Prismatics range	45	m2		-			No design - Assumed
Floor finishes									
	Entrance matting		2	Nr		-			Stage 2 design
	Screed	65mm sand-cement screed/25mm XPS insulation	3,081	m2		-			Stage 2 design
	Floor coverings	Quarry tiles to ground floor entrance	27	m2		-			Stage 2 design
		Communal staircase and circulation; carpet	404	m2		-			Stage 2 design
		Floor finish to concierge	14	m2		-		Assume carpet	Stage 2 design
		Soft pile carpet and underlay to bedrooms	627	m2		-			No design - Assumed
		Porcelain floor tiling to bathrooms, ensuites, and WC's (apartments and concierge)	269	m2		-			No design - Assumed
		Engineered timber flooring to kitchen, lounge, hall and store	1,129	m2		-			Stage 2 design
		Floor finish to cycle storage/refuse	55	m2		-		Resin paint assumed	Stage 2 design
		Floor finish to plant room	73	m2		-		Resin paint assumed	
	Skirting	Softwood skirting, painted	2,478	m		-			Stage 2 design
		Tiled skirting to bathrooms, ensuites and WC's	455	m		-			Stage 2 design
	Ancilliary residential					-			
	Floor coverings	Floor finish allowance - specification TBC	93	m2		-		Assume timber floor	No design - Assumed
	Skirting	Ensuite - Porcelain floor tiling	8	m2		-			No design - Assumed
		Tiled skirting to ensuites	16	m		-			No design - Assumed
		Softwood skirting, painted	59	m		-			No design - Assumed
Ceiling finishes									
		MF plasterboard ceilings; painted to apartments	3,081	m2	100	308,100			Stage 2 design
		Extra; moisture resistant to bathrooms and ensuites				-		Extra over costs, quantity captured within ceiling area above	Stage 2 design
		Extra; recessed ceiling detail to kitchen, living, and bedrooms				-		Extra over costs, quantity captured within ceiling area above	Stage 2 design
		Paint	3,081	m2		-			Stage 2 design
		Standard cornicing to kitchen, living and bedrooms	1,521	m		-			Stage 2 design
		Acoustic ceiling; painted to communal areas	404	m2		-			Stage 2 design
	Ancilliary residential					-			
		Ceiling finish allowance - specification TBC	93	m2		-		Assume MF plasterbaord ceiling	No design - Assumed
Fittings, Furnishings and Equipment									
		Shelving to stores	29	Nr		-			No design - Assumed
		Fitted wardrobes to all bedrooms	29	Nr		-			No design - Assumed
		Allowance for blinds/blind boxes	29	Nr		-			No design - Assumed
		Vanity units	41	Nr		-			No design - Assumed
		Mirrored bathroom cabinet to bath/ensuites	51	Nr		-			No design - Assumed
		Accessories - toilet roll, hooks, holders etc	51	Nr		-			No design - Assumed
		Kitchens	29	Nr		-			No design - Assumed
		Window boards; decoration	120	Nr		-			No design - Assumed
		Concierge desk - provisional allowance	2	m		-		Length on plan	No design - Assumed
		Post boxes	29	Nr		-			No design - Assumed
	Ancilliary Residential								
		Wall mounted mirrors to 50%	63	m2		-			No design - Assumed
		Allowance for lockers to gym	5	Nr		-		Notional quantity	
Sanitary Appliances									
		Basin	53	Nr		-			No design - Assumed
		WC	53	Nr		-			No design - Assumed
		Shower tray	11	Nr		-			No design - Assumed
		Shower screen	11	Nr					
		Bath	32	Nr		-			No design - Assumed
		Bath screen	32	Nr		-			No design - Assumed
Mechanical and Electrical Installations									
		Disposal installations	3,081	m2		-			No design - Assumed
		Water installations	3,081	m2		-			No design - Assumed
		ASHP's	29	Nr		-			No design - Assumed
		Space heating and air conditioning:							No design - Assumed
		Underfloor heating/independent room temperature controls	3,081	m2		-			No design - Assumed
		Heated towel rail to bathrooms, ensuites and WC	51	Nr		-			No design - Assumed
		Ventilation Systems:				-			No design - Assumed
		Mechanical ventilation system	3,081	m2		-			No design - Assumed
		Electrical installations:							No design - Assumed
		Main LV panels and LV distribution	3,081	m2		-			No design - Assumed
		Electrical metering	29	Nr		-			No design - Assumed
		Containment Systems	3,081	m2		-			No design - Assumed
		Distribution Boards	29	Nr		-			No design - Assumed
		Small Power	3,081	m2		-			No design - Assumed
		E/O Sonos sound system to kitchen, living, bedrooms and bathrooms	1,729	m2		-			No design - Assumed
		Lighting - General & Emergency	3,081	m2		-			No design - Assumed
		E/O motion sensor ambient lighting to bathrooms and ensuites	41	Nr		-			No design - Assumed
		Earthing and Bonding	3,081	m2		-			No design - Assumed
		Fire and Lightning Protection	3,081	m2		-			No design - Assumed
		E/O sprinklers	3,081	m2		-			No design - Assumed
		Communication, Security and Control Systems:							No design - Assumed
		CCTV	3,081	m2		-			No design - Assumed
		Access Control incl video links and handsets	29	Nr		-			No design - Assumed
		Data Cabling incl IT sockets/Telephone sockets	3,081	m2		-			No design - Assumed
		Radio, TV sockets and satellite sockets, connections incl satellite dish, DAB and FM antenna	3,081	m2		-			No design - Assumed
		Allowance for PV panels	119	m2		-			No design - Assumed
External Works									
	Hardlandscaping	Porecelain paving	92	m2		-			Stage 2 design
		Footpath gravel	228	m2		-			Stage 2 design
		Clay pavers	55	m2		-			Stage 2 design
		Stepping stones	77	m2		-			Stage 2 design
		Stone pavers on pedestals to terraced roofs	331	m2		-			Stage 2 design
	Soft Landscaping	Soft Landscaping	1,223	m2		-			Stage 2 design
		Trees allowance	25	Nr		-			Stage 2 design
	Fencing, railings, and walls	Cladding to lightwell walls	176	m2		-			No design - Assumed
		Brick faced RC retaining walls	294	m2		-			Stage 2 design
		Habitat walls	9	m		-			Stage 2 design
		400 ltr water butts	4	Nr		-			Stage 2 design
		Allowance for boundary treatments	150	m		-			No design - Assumed
		Entrance gate	1	Nr		-			No design - Assumed
	External fixtures	Allowance for seating	6	m		-		Provisional quantity	No design - Assumed
		Allowance for external bin store	35	m2		-		Provisional quantity	
		Allowance for ramps	30	m2		-		Provisional quantity	No design - Assumed
		Allowance for steps	10	m2		-		Provisional quantity	No design - Assumed
	Drainage								
		Building drainage	3,081	m2		-			No design - Assumed
		Drainage to hard surfacing	452	m2		-			No design - Assumed
		Attenuation allowance	120	m3		-			No design - Assumed
		Terrace drainage	331	m2		-			No design - Assumed
	External services								
		Residential Connections	3,081	m2		-			No design - Assumed
		External lighting allowance	452	m2		-			No design - Assumed
						5,520,941	1,792	kg/m2	
					GIA	3,081			

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