JS LEWIS LTD

Lifecycle Carbon Assessment

Enderby Place

Revision A

Maritime View Ltd

December 2023

Applicant:	Maritime View Ltd
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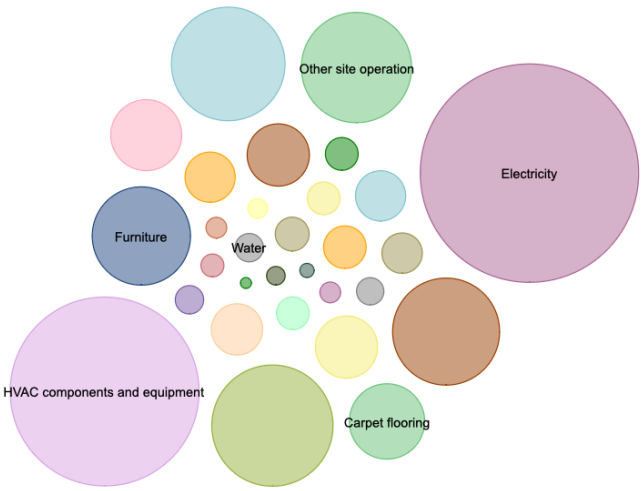
1 EXECUTIVE SUMMARY

This Lifecycle Carbon Assessment has been prepared in support of the proposed development at Enderby Place. The assessment considers the carbon implications of the development in their widest sense, addressing embodied carbon of materials, operational emissions. It is supported by the relevant GLA spreadsheet.

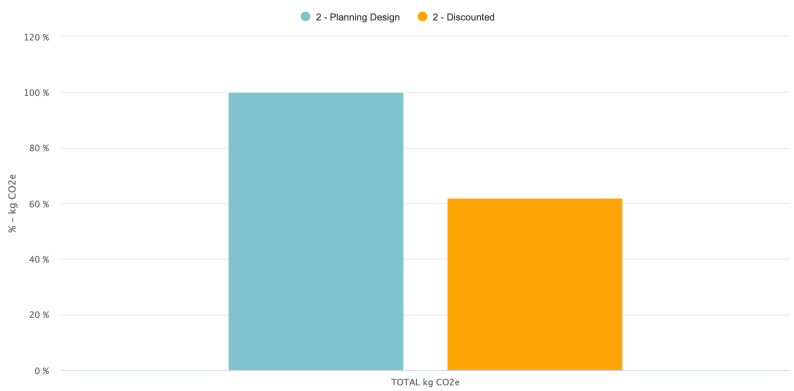
The assessment has been undertaken using OneClick LCA, an internationally recognised lifecycle assessment tool, and one that has plug-ins that allow assessments to be undertaken using the RICS and GLA methodologies.

The planning stage assessment undertaken was necessarily based upon some assumptions regarding build-ups as many relevant design decisions have not yet been made in this regard. The operational emissions are the most substantial source of lifecycle emissions for the building. A separate Energy and Sustainability Strategy addresses those emissions, and a very substantial saving over the regulated standard is achieved. The graphic below provides a sense of scale of the emissions sources for the development:



At the planning stage, there is limited input from a range of parties as the full contracting team is not appointed. A broad planning stage bill of quantities has been prepared and used in the assessment. The approach is to set key aspirations and a framework for the scheme to follow as it progresses.

The current scenario compared with the discounted scenario indicates a significant reduction in emissions:



2 INTRODUCTION

2.1 Context

The Applicant is seeking planning permission for the Enderby Place site (the "Site"). The scheme's design represents an evolution of a long design process that has involved a series of pre-application meetings with the Council and the Greater London Authority. The proposals are for three buildings rising to 3, 23 and 35 storeys respectively, and extensive landscaping and public open space. This document, a combined energy and sustainability strategy, forms one of a suite of documents that form a planning application to be submitted to the Royal Borough of Greenwich ("the Council").

Other related documents that support the application include:

- Energy and Sustainability Statement
- Overheating Risk Assessment;
- Circular Economy Statement;
- BREEAM Assessment.

This document, a whole life cycle carbon assessment ("WLCCA"), forms one of a suite of documents that form a planning application to be submitted to the London Borough of Tower Hamlets ("the Council").

The scheme has to address national, regional and the GLA's policy on lifecycle carbon. This document sets out the assessment and results as required by both the local and the regional planning policy. It should be recognised that at this stage, many of the decisions regarding materials have not been made.

2.2 Location and Scheme Description

The site sits on the Western part of the Greenwich Peninsula, and the proposed scheme includes "*The erection of part-3, part-23, part-35 storey buildings, providing up to 564 residential apartments (Class C3), light industrial (Class E(g)(iii)) and community / café use (Sui Generis), and associated highways, landscaping and public realm works*".

The basement provides cycle storage, refuse, plant space and some commercial space. The podium level provides further commercial spaces, whilst the upper floors are residential with the floor plans largely repeating. All apartments have external balconies, and significant overhangs have been designed in to reduce unwanted solar gain.

The client has appointed a design team to develop the proposals that address local, regional and national policy, and to submit the planning application.

3 POLICY CONTEXT

3.1 London Policy

The London Plan (2021)

Policy SI2 reflects the current adopted position on lifecycle carbon assessments:

Policy SI 2 Minimising greenhouse gas emissions

F Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

The London Plan goes on to define whole life cycle carbon as follows:

Whole life-cycle carbon

Whole life-cycle carbon emissions are the total greenhouse gas emissions arising from a development over its lifetime, from the emissions associated with raw material extraction, the manufacture and transport of building materials, to installation/ construction, operation, maintenance and eventual material disposal.

The GLA have been running a consultation on their Whole Life Cycle Carbon Guidance document. The aspects of projects that should be covered are:

1. Reuse and retrofit of existing structures;
2. Use recycled or repurposed materials;
3. Selection low carbon materials;
4. Minimising operational energy;
5. Minimising operational water;
6. Design for disassembly and reuse;
7. Building shape and form;
8. Regenerative design;
9. Design for durability and flexibility;
10. Optimisation of relationship between operational and embodied carbon;
11. Building life expectancy;
12. Local sourcing;
13. Minimising waste;
14. Efficient fabrication;
15. Lightweight construction;
16. Circular economy.

There is a template for completing the WLC emissions for reporting purposes. This is provided as an output from OneClick CLA for the purposes of this report.

At the detailed planning stage the GLA guidance expects the following:

- *Context of the project;*
- *Estimated WLC Emissions (kg CO2e and kg CO2e/m2 GIA) for each life- cycle module, which will form the baseline for the development. (At outline planning stage this can be based on default figures from the RICS PS. At detailed planning stage this should be based on bespoke building assumptions);*

- *Actions taken to reduce whole life-cycle carbon emissions and emission reductions achieved;*
- *Opportunities specified to further reduce the development's WLC emissions;*
- *Assumptions made with respect to maintenance, repair and replacement cycles for all primary building systems (structure, substructure, envelope, MEP services, internal finishes);*
- *A list of EPDs used to assess product carbon factors;*
- *Key site constraints and opportunities in terms of reducing WLC emissions.*

3.2 Policy and Guidance Analysis

WLC assessments are expected of referable applications. The GLA's guidance on how to prepare this is a draft document only. It is notable that there are significant assumptions regarding the level of information available at the different stages of planning that do not necessarily reflect the realities of when and how design decisions are made.

4 PROPOSED APPROACH

4.1 Reuse and retrofit of existing structures

The previous application established the density expected of the site. The site is cleared and there is no demolition required/proposed, and accordingly there is no demolition audit.

4.2 Use recycled or repurposed materials

The scheme has the potential to incorporate recycled and repurposed materials, although much of this will be part of the detailed specification, a stage which the scheme is not yet at. Opportunities include:

- Concrete with recycled aggregates;
- Plasterboard with recycled content;
- Metal frames with recycled content;
- Carpet underlay.

4.3 Selection low carbon materials

The structure proposed is high density and up to 35 storeys in height, which constrains the available options for structure. A concrete frame is the most likely solution to the structure, meaning that the focus should be upon achieving as sustainable a concrete choice as possible. Suppliers Environmental Product Declarations will be considered as part of the design and procurement procedure post-planning.

A second important consideration for the building will be the use of cladding materials that are durable. Glass-reinforced cement panel and metal cladding are proposed. Both have the potential for long lifespans if designed and selected judiciously.

4.4 Minimising operational energy

Operational energy is addressed in the Energy and Sustainability Statement that supports the application. Substantial CO2 reductions have been achieved through the proposed strategy.

4.5 Minimising operational water

Operational water consumption is addressed in the Energy and Sustainability Statement that supports the application. Fittings are to be selected to achieve a water consumption of 105 litres per person per day.

4.6 Design for disassembly and reuse

The cladding systems have the potential to be designed for ready dismantling. This will be considered at the post-planning stage in more detail. A concrete frame is less likely to be dismantled with ease. The scheme also lends itself to an element of offsite construction and assembly onsite, and therefore the corollary of easy disassembly.

Building information modeling can be used to prepare an inventory of materials and products used to create the building, allowing for full access to the original design if an any point in the future alternations are proposed, or if disassembly is proposed.

Take-back schemes on short-lifespan products should be used, and low toxicity materials should be preferred throughout to avoid contamination and the resulting waste implications arising. Wherever possibly, fixings should be reversible, and bonding/gluing should be avoided.

4.7 Building shape and form

The proposed building form is highly efficient and achieves a very low materials to accommodation space provided. This is a function of the type of development and the number of shared party walls and floors.

4.8 Regenerative design

Opportunities for regenerative design will be considered at the materials procurement stage, including a specific workshop with the designers.

4.9 Design for durability and flexibility

The floor to ceiling heights proposed and core locations provide the building with some flexibility in the future as to either a variation in layout with the same use class, or with a different use class potentially. Access has been carefully considered to allow for servicing to the front and rear, with suitable accessibility designed in for wheelchair users.

The M+E system design could consider how zoning might improve the potential for flexible use later in the building life.

4.10 Optimisation of relationship between operational and embodied carbon

The fenestration has been considered - the level of glazing is not excessive, ensuring that the benefits outweigh the impacts. Overheating is avoided and good sunlight and daylight levels are achieved.

4.11 Building life expectancy

The proposals have had to consider longevity throughout the design process up to planning, including the following measures:

- Sizing drainage based upon future climate scenarios;
- Assessing overheating using future climate scenarios.

A schedule should be drawn up for both planned and preventative maintenance.

4.12 Local sourcing

Environmental Product Declarations and transport distances will be considered as part of the materials supply procurement, particularly for the more massive components such as concrete.

4.13 Minimising waste

A waste management strategy will also be prepared that will look to interpret the waste hierarchy and its application to the site for demolition, construction and operational phases of the building. Take-back schemes on short-lifespan products should be used.

4.14 Efficient fabrication

Whilst the majority of decisions regarding materials have yet to be made, there are opportunities for offsite construction including:

- External insulated cladding;
- Balconies;
- Bathroom pods.

The design achieves a very high level of repetition and efficiency from its floorplate design and repeated elements. Modularisation is touched upon in the previous section noting that there are options for modular elements of the building to be built offsite.

4.15 Lightweight construction

Taller buildings do not lend themselves to lightweight structural solutions. However, there is an incentive to minimise the weight of the building to minimise the structural requirements. Using light-weight stud walls internally can help to reduce the structural loads, and therefore the impacts of the frame.

4.16 Circular economy

A separate Circular Economy Statement has been prepared.

4.17 EPDs and Limitations

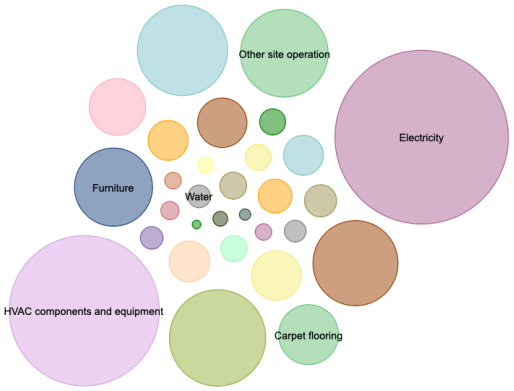
As yet it is not possible at this stage of the project to select specific products, so there is no list of EPDs. The limitations of the project are that as a tall development, concrete will play a major role in the structure. However, the material efficiency per unit is very good due to the density.

5 ASSESSMENT RESULTS

5.1 Current Scenario

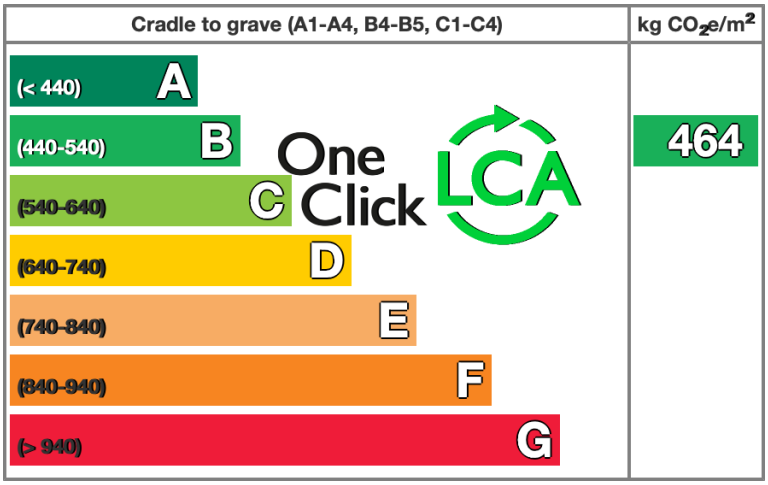
	Biogenic carbon (kg CO2e)	A1-A3 Product Stage	A4 Transportation to site	A5 Site operations	B1 Use Phase	B2 Maintenance	B3 Repair	B4 Material replacement - materials	B5 Material refurbishment	B6 Operational Energy use - Regulated	B6 Operational Energy use - Unregulated	B7 Operational Water use	C1 Deconstruction / demolition	C2 Waste transportation	C3 Waste processing	C4 Waste disposal	TOTAL kg CO2e	D External Impacts (not included in totals)
0.1 Toxic Mat.																		
0.2 Demolition													174,342				174,342	
0.3 Supports																		
0.4 Groundworks																		
0.5 Diversion																		
1 Substructure			617,332				-							279,588	29,975		926,896	(1,496,715)
2.1 Frame			381,634				-							258,760	23,185		663,579	(1,029,374)
2.2 Upper Floors			305,379				-							114,563	13,542		433,484	(711,621)
2.3 Roof			5,497				-							49,974	2,839		58,310	(70,863)
2.4 Stairs & Ramps			7,680				-							4,064	405		12,148	(19,329)
2.5 Ext. Walls			1,445				-	19,390	-					6,004	454,778	237	481,854	(161,240)
2.6 Windows & Ext. Doors			7,478				-	87,352	-					69,460	3,636		167,926	(8,247,326)
2.7. Int. Walls & Partitions	-	405,645	1,862	34,841			-							16,348	592	176	459,465	(57,768)
2.8 Int. Doors	-	872,901	1,078	-			-	724,990	-					8,293	745	56	1,608,064	(705,597)
3 Finishes	(103,267)	245,536	1,733	46,868			-	821,536	-					6,299	292,261	302	1,311,268	(254,302)
4 Fittings, furnishings & equipments	(337,911)	299,822	1,758	12,174			-	1,012,253	-					726	339,860	99	1,328,781	-
5 Services (MEP)	-	3,951,770	7,403	100,273			-	4,671,368	-	7,499,995		50,838		26,423	2,334	420	16,310,823	(2,854,337)
6 Prefabricated																		
7 Existing bldg																		
8 Ext. works	-	1,314	23	-			-							29	3		1,369	(359)
Other or overall site construction				998,543													998,543	
Unclassified / Other					(2,403,845)	512,770	-										(1,891,075)	
TOTAL kg CO2e	(441,178)	5,776,988	1,340,303	1,192,699	(2,403,845)	512,770	-	7,336,889	-	7,499,995		50,838	174,342	840,531	1,164,155	1,290	23,045,777	(15,608,833)

5.2 RICS Category Breakdown



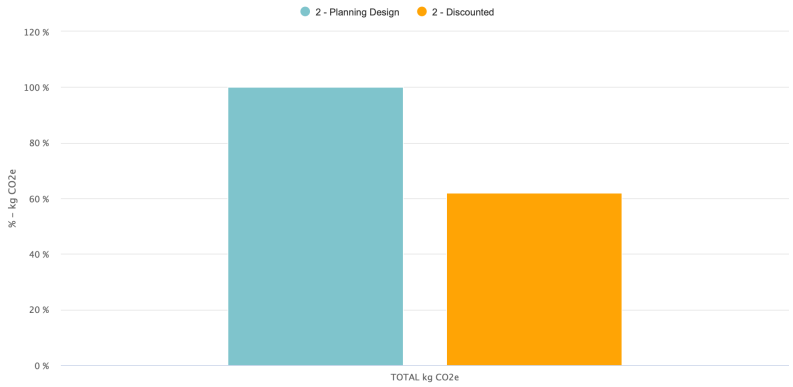
5.3 Performance Benchmarking

The scheme performs well based upon the generic build-ups used when compared with other buildings in the same sector:



5.4 Discounted Scenario

A discounted scenario was reviewed to determine the impact of the projected reductions in electricity's carbon factor. Overall, the future scenario which accounts for the reduction in electricity emissions demonstrates a very substantial reduction (circa 39%) in Whole Life Cycle Carbon.



6 CONCLUSION

6.1 Assessment

A whole life cycle carbon assessment has been prepared for the proposed development at Enderby Place. The scheme has been assessed using OneClick LCA's RICS and GLA compliant tool. This provides an early overview of the lifecycle emissions.

At the planning stage there remain a lot of design decisions that have not yet been answered, leaving limited information upon which to undertake an assessment. Nevertheless, various design measures have already been adopted to increase the building circularity. Further measures are suggested for the post-planning stages of design including:

- Early post-planning workshop, reviewing in particular the key design decisions including:
  - Structure and fundamental materials;
  - Design for longevity and disassembly;
  - Offsite and modular construction opportunities.
- Ongoing workshops at regular intervals to inform the ongoing design decision-making.

6.2 Emissions Reductions

The current scenario already achieves very substantial reductions over a business-as-usual scenario due to the energy strategy that has been put in place. That saves approximately 75% on the operational emissions.

The carbon emissions within the materials will be assessed for product specific emissions and further emissions reduction opportunities as the scheme progresses from RIBA stage 2/3 onwards to detailed design and procurement. Finally, the scheme then makes a further saving using the future discounted scenario of 39%, based again largely on the impact of the grid decarbonisation on the services-related emissions.

6.3 Statement of Policy Compliance

In the development of the proposals, the design team has reviewed, interpreted and addressed the relevant planning policy on the circular economy. It is compliant with the following documents:

The National Planning Policy Framework (2023)
The London Plan (2021)
The Mayor's Guidance on Whole Life Cycle Carbon Assessments (2022)

6.4 Supporting Documentation

The following documents are appended to this document or provided separately:

- GLA WLLCA Template

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