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**Whole Life Cycle
Carbon Emissions
Assessment**

Peabody Trust, Catalyst by Design and
Hill Residential Limited

St Ann's New Neighborhood

Final

Zeta Stebbings

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Executive Summary

This Whole Life Cycle Carbon Emissions (WLCCE) Assessment has been prepared in support of the Reserved Matters Application (RMA) for Phases 1B and 2 of St Ann's New Neighbourhood in the London Borough of Haringey. It has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development.

The application for Phases 1B and 2 proposes to deliver 464 homes and a small ground floor commercial unit. This development achieves the whole life carbon emissions targets in line with GLA planning policy and the masterplan consent.

National Building Regulations and the Mayor's net zero-carbon target for new development account for a building's operational carbon emissions. As methods and approaches for reducing operational emissions have become better understood, and as targets have become more stringent, these emissions are now beginning to make up a declining proportion of a development's carbon emissions. Attention now needs to turn to WLCCE to incorporate embodied carbon emissions, enabling a better understanding of the environmental impact of the proposed development.

WLCCE are the carbon emissions resulting from the construction and the use of a building over its entire life, through four stages described as life-cycle modules, as shown in Figure i overleaf.

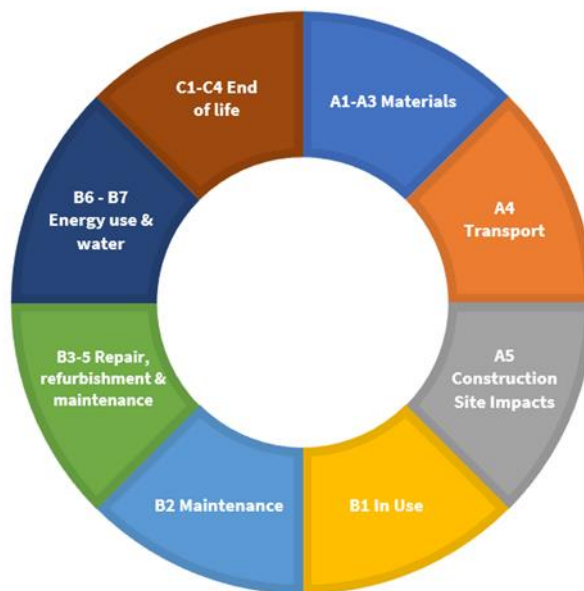


Figure i: Life cycle modules included within WLCCE assessment.

They capture a building's operational carbon emissions from both regulated and unregulated energy use, as well as its embodied carbon emissions. Embodied emissions are 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. The assessment provides a picture of a building's carbon impact on the environment.

This WLCCE assessment is being undertaken in compliance with London Plan 2021 Policy (SI 2), the methodology has followed the principles of BS EN 15978 and has used both the GLA guidance and RICS as the methodology for assessment. This has been facilitated through the use of GLA approved One Click LCA software.

The following table outlines the assumptions made within this WLCCE assessment:

Table i: WLCCE assumptions

Data	Data source
Material types and volumes (A1-A3)	Material types were provided by the applicant and the architect. Where material types and volumes were not available from these sources, the One Click LCA Carbon tool was used to estimate values. 95% of the cost allocated to each building element category has been accounted for in the assessment.
Transport data (A4)	Default values provided by One Click.
Construction site impacts (A5)	Construction value provided by applicant and baseline target provided by BRE. Waste estimates were provided by the Applicant. The floor areas used for emissions associated with demolition are assumed to be 2,937m ² (Phase 1B) and 4,515m ² (Phase 2).
Refrigerants (B1)	Refrigerant quantity has been estimated based on the use of approximately 112kg of Propane within the Air Source Heat Pumps (as provided by the AWA Consultants) with annual leakage of 2% and 1% end of life leakage rate with a 99% end of life recovery (as per TM65).
Maintenance (B2)	B2 emissions have been calculated at 10kgCO ₂ /m ² , as per GLA guidance.
Repair and Replacement data (B3-B4)	An assumption has been made based on GLA guidance that assumes B3 emissions are 25% of the total B2 emissions for the site. Default values provided by RICS and One Click EPD database for products inputted into software for B4 emissions.
Refurbishment (B5)	At present One Click does not have ways to consider B5 emissions. However, based on the information provided for B3 and B4 it is likely that these have emissions have been accounted for.

Data	Data source
Operational energy (B6)	Energy calculations based on SAP and SBEM calculations from the Energy Statement by Hodkinson Consultancy November 2023). Operational carbon emissions for non-residential uses have been reported using CIBSE TM54.
Operational water (B7)	Water consumption based on Building Regulations Part G 'Enhanced Consumption' of 110 l/pp/d and multiplied by the intended full occupancy of the development.
End of life (C1-C4)	Default values provided by One Click based on the information within the EPD database.
Building areas	Building areas were provided by the architect in the drawings: Residential – 44,109m ² Non-residential (Use Class E / F1/ F2)– 99.28m ²
Number of occupants	Residential- 1,613 Non-residential – 11 occupants based on the <i>BREEAM New Construction 2018 Occupant Density Guide (Transport 02)</i> Total - 1,624
Assessment period	60 years

The expected WLLCE are lower than the GLA WLC Benchmark for all modules. This demonstrates that Phase 1B and 2 at St Ann's New Development have taken account of relevant policy and reduced emissions as far as reasonably possible and are therefore policy compliant. The total emissions for Phases 1B and 2, based on the GLA guidance is **997 kgCO₂/m² GIA over 60 years**. This is broken down as follows:

- > 745 kgCO₂/m² for modules A1-A5 (excluding sequestered carbon).
- > 252 kgCO₂/m² for modules B-C.

When operational energy and water emissions are included in the calculation above the total emissions are expected to be **1,400 kgCO₂/m² GIA over 60 years**.

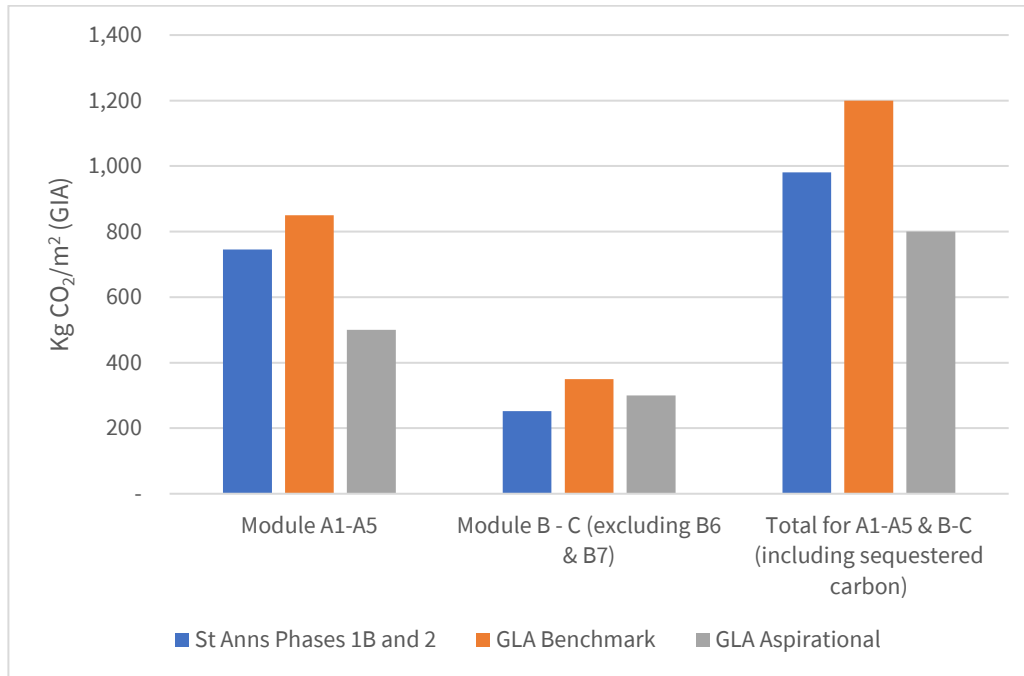


Figure ii: Total kgCO₂ /m² Gross Internal Floor Area (GIA) performance compared to GLA Benchmarks

A series of high-level opportunities to further reduce carbon emissions post planning have also been made. These measures will be looked at in detail in the next stage of the design development process and included, where possible.

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1. INTRODUCTION

- 1.1** This Whole Life Cycle Carbon Emissions (WLCCE) Assessment has been prepared for Phases 1B and 2 of St Ann's New Neighbourhood in the London Borough of Haringey for Peabody Trust, Catalyst by Design and Hill Residential Limited. It has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development.
- 1.2** The purpose of this WLCCE assessment is to demonstrate that the proposed development has undertaken an assessment based on the information available to date which will need to be updated as the project progresses. This WLCCE assessment is an extension of the work completed in the Hybrid Application, with a significantly more detailed understanding of Phases 1B and 2.
- 1.3** National Building Regulations and the Mayor's net zero-carbon target for new development account for a building's operational carbon emissions. As methods and approaches for reducing operational emissions have become better understood, and as targets have become more stringent, these emissions are now beginning to make up a declining proportion of a development's carbon emissions. Attention now needs to turn to WLCCE to incorporate embodied carbon emissions, enabling a better understanding of the environmental impact of the proposed development.
- 1.4** The assessment of the proposed development endeavours to help the design team understand, at concept design stage, the lifetime consequences of their design decisions. This report should be read in conjunction with the '*GLA Whole Life Carbon Assessment Template*' which has been submitted alongside this Application.

2. DEVELOPMENT OVERVIEW

Site Location

- 2.1** The development site is located at St Ann's Hospital in the London Borough of Haringey. The location is shown in Figure 1 below.

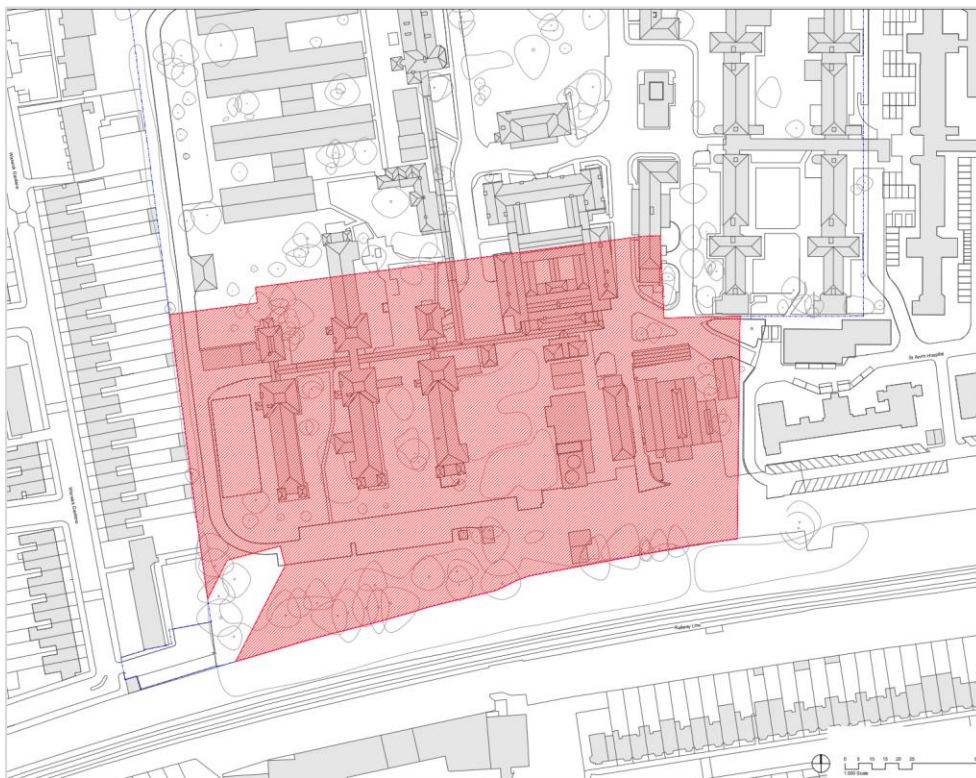


Figure 1: Site Location – Karakusevic Carson Architects (July 2023)

Proposed Development

- 2.2** RMA 1 seeks detailed approval of the appearance, landscaping, layout and scale of Phases 1b and 2 of the outline component of the hybrid application at St Ann's Hospital, which covers Plots E-J on the illustrative masterplan.
- 2.3** The proposed development is described as follows:

Application for the approval of reserved matters respect of appearance, landscaping, layout and scale relating to Phases 1b and 2 associated with the outline component of planning permission HGY/2022/1833 for "Outline planning permission (with all matters reserved except for access) for Phases 1B, 2 and 3, for: (a) the erection of new buildings for residential development (Use Class C3) and a flexible range of non-residential uses within Use Class E, F1/F2; (b) provision of associated pedestrian

and cycle accesses; (c) landscaping including enhancements to the St Ann's Hospital Wood and Tottenham Railsides Site of Importance for Nature Conservation (SINC); and, (d) car and cycle parking spaces and servicing spaces.” Figure 2 below illustrates the proposed site layout.



Figure 2: Proposed Site Layout – Lambert Smith Hampton (June 2023)

Existing Development

- 2.4** The Site currently comprises over 40 buildings formerly part of St Ann’s hospital which vary in height from two to three storeys.
- 2.5** The Site has a relatively flat topography with a gentle fall west to east and north to south. It comprises a mix of natural landscaped elements including a Site of Importance for Nature Conservation (SINC) to the south. The SINC comprises standalone mature trees covered by individual tree protection orders (TPOs) and a lawn in the centre known as the Peace Garden.

3. POLICY AND REGULATIONS

Regional Policy: The London Plan

London Plan (2021)

- 3.1** The London Plan sets out an integrated economic, environmental, transport and social framework for the development of London. The following policies are considered relevant to the proposed development and this Statement:

3.2 Policy SI 2 Minimising Greenhouse Gas Emissions, states:

'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:

Operational carbon emissions will make up a declining proportion of a development's whole life-cycle carbon emissions as operational carbon targets become more stringent. To fully capture a development's carbon impact, a whole life-cycle approach is needed to capture its unregulated emissions (i.e., those associated with cooking and small appliances), its embodied emissions (i.e., those associated with raw material extraction, manufacture and transport of building materials and construction) and emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal). Whole life-cycle carbon emission assessments are therefore required for development proposals referable to the Mayor. Major non-referable development should calculate unregulated emissions and are encouraged to undertake whole life-cycle carbon assessments. The approach to whole life-cycle carbon emissions assessments, including when they should take place, what they should contain and how information should be reported, will be set out in guidance'.

Guidance Documents

- 3.3** Guidance has been released by the Greater London Authority "Whole Life-Cycle Carbon Assessments guidance – March 2022". It outlines how to prepare a WLCCE assessment which should accompany all referable Planning Applications in line with London Plan Policy SI 2 'Minimising Greenhouse Gas Emissions'.
- 3.4** The guidance is accompanied by an assessment template, which provides separate tabs outlining the information that should be submitted at each stage. This template has been provided as a standalone document which should be read in addition to this assessment report.

4. WHOLE LIFE CYCLE CARBON EMISSIONS ASSESSMENT

- 4.1** Undertaking WLCCE assessments is a way to fully understand and minimise the carbon emissions associated with building designs over the entire life cycle of the building. This will be done at the proposed development to quantify the WLCCE that will be released, considering not only operational and embodied emissions but also demolition, construction, and refurbishment and replacement cycles.
- 4.2** The London Plan has introduced a requirement (Policy SI 2 ‘*Minimising Greenhouse Gas Emissions*’) for all new referable developments to calculate and reduce WLCCE, this is both embodied and operational carbon:
- > **Operational carbon** is the energy required to heat and power a building.
 - > **Embodied carbon** is the carbon that is released in the manufacturing, production, and transportation of the building materials used.
- 4.3** In addition to the two metrics above there are additional life cycle stages that are considered during WLCCE assessments, these include demolition, end of life and refurbishment/replacement cycles.
- 4.4** The two metrics (operational and embodied) and the additional life cycle stages, as noted above, have been included in this WLCCE assessment as per GLA guidance.
- 4.5** Undertaking a WLCCE assessment provides a full overview of the material and construction of a building using science-based metrics whilst also identifying the overall best combined opportunities for reducing lifetime emissions, and also helps to avoid any unintended consequences of focusing on operational emissions alone.

Methodology

- 4.6** During the hybrid planning application, Peabody Trust, Catalyst by Design and Hill Residential Limited were required to submit an outline WLCCE assessment for the masterplan. Condition 6b of this application required more detailed WLCCE assessments to be undertaken to support all future RMA applications.
- 4.7** WLCCE assessments are sensitive to changes in design and specification and therefore detailed design will impact the results as the scheme progress. As noted in the GLA guidance, WLCCE assessments should be conducted at the following stages in order to maximise design efficiencies:
- > Pre Application.

- > Stage 1 submission (RIBA 2/3).
- > Post construction (RIBA 6).

- 4.8** This assessment is considered to be the Stage 1 submission and has been completed for the proposed development using information provided by the design team, submitted for as part of this RMA.
- 4.9** A set of WLCCE benchmarks have been developed by the GLA in which applicants are required to compare against their own results as part of the assessment and which the GLA will refer to in its review of these assessments. An 'aspirational' set of benchmarks have also been devised for applicants that wish to go further. Both sets of benchmarks are included in this assessment and are being reported on.

Study Period

- 4.10** The reference study period (RSP) is 60 years, this is based on the principles outlined in BS EN 15978: 2011, section 7.3 and the RICS guidance. RSPs are fixed to enable comparability between whole life carbon results for different projects. It ensures that the assessment is representative of typical service life of different building elements.

Operational Carbon

- 4.11** Operational energy is the inputted energy required for all heating and power needs. It can be split into two variants:
- > **Regulated emissions** are assessed using the Government's approved methodology for Building Regulations Part L compliance, the Standard Assessment Procedure (SAP) for residential units; and
 - > **Unregulated emissions** are energy use as a direct result of user behaviour. This includes cooking, white goods (fridges, washing machines, etc), and plug-in electrical loads (televisions, laptops, lamps, etc).
- 4.12** Both of the above elements have been accounted for in this WLCCE assessment, these were provided by the calculations completed for the Energy Statement submitted for planning (Hodkinson, November 2023). For clarity, as unregulated energy demands are largely reliant on the behaviour of occupants, they have been considered a fixed entity in the calculations in accordance with the guidance.

Non-Residential

- 4.13** The estimated energy demand for the commercial unit has been calculated using Simplified Building Energy Model (SBEM) software, using the National Calculation Method (NCM 2021 Edition). SBEM calculates the Regulated energy demands associated with hot water, space heating and fixed electrical items, as well as unregulated energy demands. Operational unregulated energy demands associated with non-residential items outside of the commercial space (i.e. electric vehicle charging, external lighting, corridors, and lifts) are accounted for separately. They are presented as the landlord's energy demands at the Be Seen stage, in line with the London Plan Energy Hierarchy.
- 4.14** A sample shell only SBEM calculation has been carried out on the commercial unit. The sample calculation has been extrapolated to gain energy demand estimates representative of the total area to be provided. More detail is available in the submitted Energy Statement (Hodkinson, November 2023).

Residential

- 4.15** The estimated annual energy demand for the residential portion of the development has been calculated using Standard Assessment Procedure (SAP) methodology. SAP calculates the Regulated energy demands associated with hot water, space heating and fixed electrical items.
- 4.16** SAP calculations have been carried out for representative home types. These encompass houses and exposed floor, mid floor, top floor and corner flats, at different orientations, and therefore represent a fair aggregation of the unit mix of the site.
- 4.17** To provide energy demands across the entirety of Phases 1 and 2, the accommodation schedule has been used to extrapolate the energy performance across the whole application area.
- 4.18** The unregulated energy demands, discussed further in *Be Seen*, for the residential units have been calculated using the methodology outlined in the SAP 10.2 document. This calculates the CO₂ emissions associated with appliances and cooking and are calculated using the BRE methodology.

TM54 Modelling

- 4.19** Due to the size of the commercial space and the shell-only design, TM54 modelling has not been undertaken. SBEM modelling has been used for the commercial space energy calculations, as outlined above in the non-residential methodology.
- 4.20** The principles of the TM54 methodology have been applied to determine non-residential ancillary energy demands for electric vehicle charging, external lighting, corridors, and lifts. As these energy demands are neither associated with the residential units or commercial space, they are categorised separately as landlord's unregulated energy demand. In line with the energy hierarchy, these ancillary energy demands are presented separately in the Be Seen stage.

Embodied Carbon

One Click LCA

- 4.21** OneClick LCA is the software that has been used to conduct the WLCCE assessment. This is a web-based piece of design software for buildings and infrastructure approved for use by the GLA.
- 4.22** OneClick LCA consists of a large database of generic and average Life Cycle Indicator (LCI) data, and global Environmental Product Declaration (EPDs). The most suitable option for each material (where available) was chosen from the database in OneClick. The material LCI data has been chosen to be representative of the typical UK supply chain.
- 4.23** The life cycle stages (or modules) included within the WLCCE assessment as standard are shown in Figure 3 below.

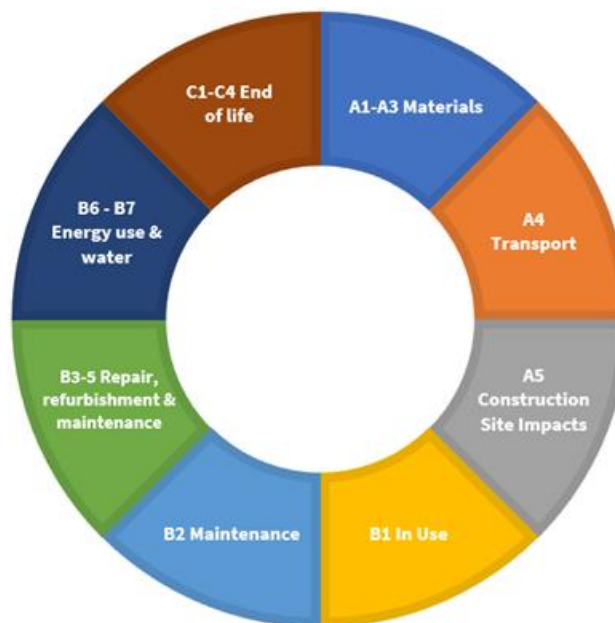


Figure 3: Life cycle modules

- 4.24** At this stage it is not expected that all the information will be available. Where this is the case, One Click has been used to calculate the required values for the assessment. As the design develops, we will update and refine the tool to reflect the quantity and types of materials being used.

Construction Impacts

- 4.25** In addition to embodied carbon in the materials used for construction, greenhouse gas (GHG) emissions will be created by transportation of materials to site and operation of onsite plant and machinery. Guidance from RICs indicates 1.4 tonnes of CO₂e per £100,000 of project value, this is

further referenced and approved by the BRE. The project value has been provided by the Applicant, which has allowed the construction transport GHG emissions to be included.

Potable Water Use

- 4.26** The carbon impact associated with water use during the operation of the proposed development is also required to be reported, in accordance with the RICS guidance. Water consumption is based on Building Regulations Part G 'enhanced consumption' of 110 litres/per person/per day (including external water use) and multiplied by the intended full occupancy of the development annually.
- 4.27** Occupants have been assumed based upon the expected number of residents on site as per the Accommodation Schedule. This gives an estimated **annual water consumption of 64,761m³** for the entire development for 60 years.

Carbon Sequestration

- 4.28** Sequestered carbon in timber has been included in the WLCCE assessment as all timber is assumed to be sustainably sourced. However, when reporting the results for Modules A1 – A5, the sequestered carbon has been excluded.

Data Sources

- 4.29** 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 following data sources have been used:

Table 1: Data Sources

Data	Data source
Material types and volumes (A1-A3)	Material types were provided by the applicant and the architect. Where material types and volumes were not available from these sources, the One Click LCA Carbon tool was used to estimate values. 95% of the cost allocated to each building element category has been accounted for in the assessment.
Transport data (A4)	Default values provided by One Click.
Construction site impacts (A5)	Construction value provided by applicant and baseline target provided by BRE. Waste estimates were provided by the Applicant. The floor areas used for emissions associated with demolition are assumed to be 2,937m ² (Phase 1B) and 4,515m ² (Phase 2).
Refrigerants (B1)	Refrigerant quantity has been estimated based on the use of approximately 112kg of Propane within the Air Source Heat Pumps (as provided by the

Data	Data source
	AWA Consultants) with annual leakage of 2% and 1% end of life leakage rate with a 99% end of life recovery (as per TM65)
Maintenance (B2)	B2 emissions have been calculated at 10kgCO ₂ /m ² , as per GLA guidance.
Repair and Replacement data (B3-B4)	An assumption has been made based on GLA guidance that assumes B3 emissions are 25% of the total B2 emissions for the site. Default values provided by RICS and One Click EPD database for products inputted into software for B4 emissions.
Refurbishment (B5)	At present One Click does not have ways to consider B5 emissions. However, based on the information provided for B3 and B4 it is likely that these have emissions have been accounted for.
Operational energy (B6)	Energy calculations based on SAP and SBEM calculations from the Energy Statement by Hodkinson Consultancy (November 2023). Operational carbon emissions for non-residential uses have been reported using CIBSE TM54.
Operational water (B7)	Water consumption based on Building Regulations Part G 'Enhanced Consumption' of 110 l/pp/d and multiplied by the intended full occupancy of the development.
End of life (C1-C4)	Default values provided by One Click based on the information within the EPD database.
Building areas	Building areas were provided by the architect in the drawings: Residential – 44,109m ² Non-residential (Use Class E / F1/ F2)– 99.28m ²
Number of occupants	Residential- 1,613 Non-residential – 11 occupants based on the <i>BREEAM New Construction 2018 Occupant Density Guide (Transport 02)</i> Total - 1,624
Assessment period	60 years

- 4.30** For clarity, all assumptions made within the WLCCE assessment have been noted within this report. The assessment and comments made throughout should be taken within the context of carbon and energy use only.

5. WHOLE LIFE CYCLE CARBON RESULTS

- 5.1** As noted above, this is an initial assessment based on the best available information which will need to be updated as the project progresses in line with GLA requirements.

Benchmark Comparison

- 5.2** The results when compared to the GLA benchmark values, as noted in the GLA guidance note “*Whole Life-Cycle Carbon Assessments guidance – March 2022*” are shown in Table 2 below:

Table 2: Whole Life Carbon Baseline (GLA Guidance)

Modules	St Ann’s New Neighborhood	WLC Benchmark	Aspirational Benchmark
		kg CO ₂ e/ m² GIA	
Modules A1 – A5	745	<850	<500
Modules B – C (excluding B6 and B7)	252	<350	<300
Total for A1-A5 & B-C	997	<1200	<800

- 5.3** It must be noted that no benchmark has been set by the GLA for operational and energy use (life cycle stages B6-B7) due to insufficient data at present. The results for these have therefore been omitted from the totals in the graph above.
- 5.4** The total emissions, based on the GLA guidance is **997 kgCO₂/m² GIA over 60 years.**
- > 745 kgCO₂/m² for modules A1-A5 (excluding sequestered carbon).
 - > 252 kgCO₂/m² for modules B-C.
- 5.5** When operational energy and water emissions are included in the calculation above the total emissions are expected to be **1,400 kgCO₂/m² GIA over 60 years.**

- 5.6** A set of WLCCE benchmarks have been developed by the GLA in which applicants are required to compare against their own results as part of the assessment and which the GLA will refer to in its review of these assessments. An 'aspirational' set of benchmarks have also been devised for applicants that wish to go further. Both sets of benchmarks are included in this assessment are being reported on.
- 5.7** The expected WLCCE are lower than the GLA WLC Benchmark for all modules. This demonstrates that Phases 1B and 2 at St Ann's New Neighbourhood has taken account of relevant policy and reduced emissions as far as reasonably possible based on current information available, as shown in Figure 4 below.

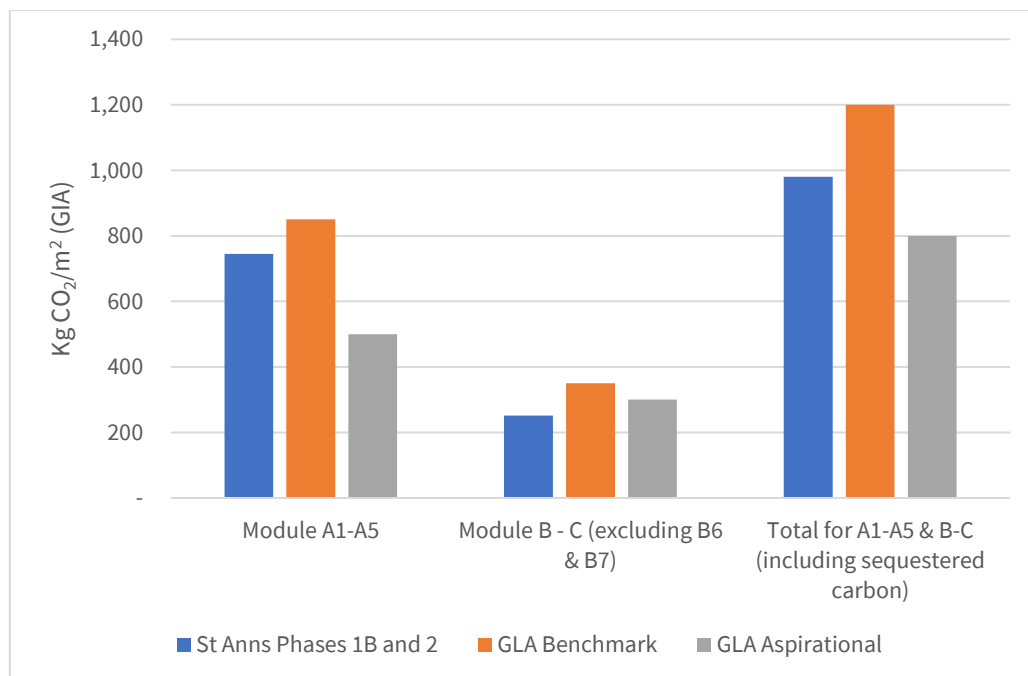


Figure 4: Total kgCO₂/m² GIA performance compared to GLA Benchmarks

- 5.8** These benchmarks will be subject to change as the WLCCE assessment gets updated in future. The full results are as follows:

Table 3: Full WLCCE Results

Category	Global warming potential	Total kgCO ₂ e over 60 years	Total kgCO ₂ e/m ² GIA over 60 years
A1-A3	Construction Materials	29,401,434	665
A4	Transport	696,254	15.75
A5	Site operations	2,854,131	64.56

Category	Global warming potential	Total kgCO ₂ e over 60 years	Total kgCO ₂ e/m ² GIA over 60 years
B1	In Use	18,686	0.42
B2	Maintenance	442,080	10
B3	Repair	110,520	2.5
B4	Replacement/Refurbishment	8,709,417	197.01
B6	Operational energy use	17,818,323	403.06
B7	Operational water use	76,160	1.72
C1-C4	End of life	1,876,650	42.45
Total		62,003,565	1,402
Carbon Sequestering		-723,673	-16.37
TOTAL		61,279,892	1,386

- 5.9** The above results demonstrate **that 61,239 tonnes** are expected to be emitted over a 60-year period.
- 5.10** The operational energy (B6) makes up 29% of the overall emissions for the proposed development; 10% for regulated energy use and 19% for unregulated use.
- 5.11** Materials (A1 – A3) make up 47% of the overall emissions. There has already been a big focus on material selection which is why this percentage share is not bigger. Further focus should be given to reduce embodied carbon, especially surrounding the façade and general structure of the building.
- 5.12** 6% of emissions are a result from the transport of materials to site and construction stages (A4 and A5), whilst this is small in comparison to elements it is still important to reduce transport emissions through the local sourcing of materials and to reduce consumption of energy and water during consumption, where possible.
- 5.13** There are also impacts, with the in-use life-cycle module B1-B5 making up approximately 15% of all embodied carbon emissions. This is primarily due to materials that will need replacing over the 60-year study period.

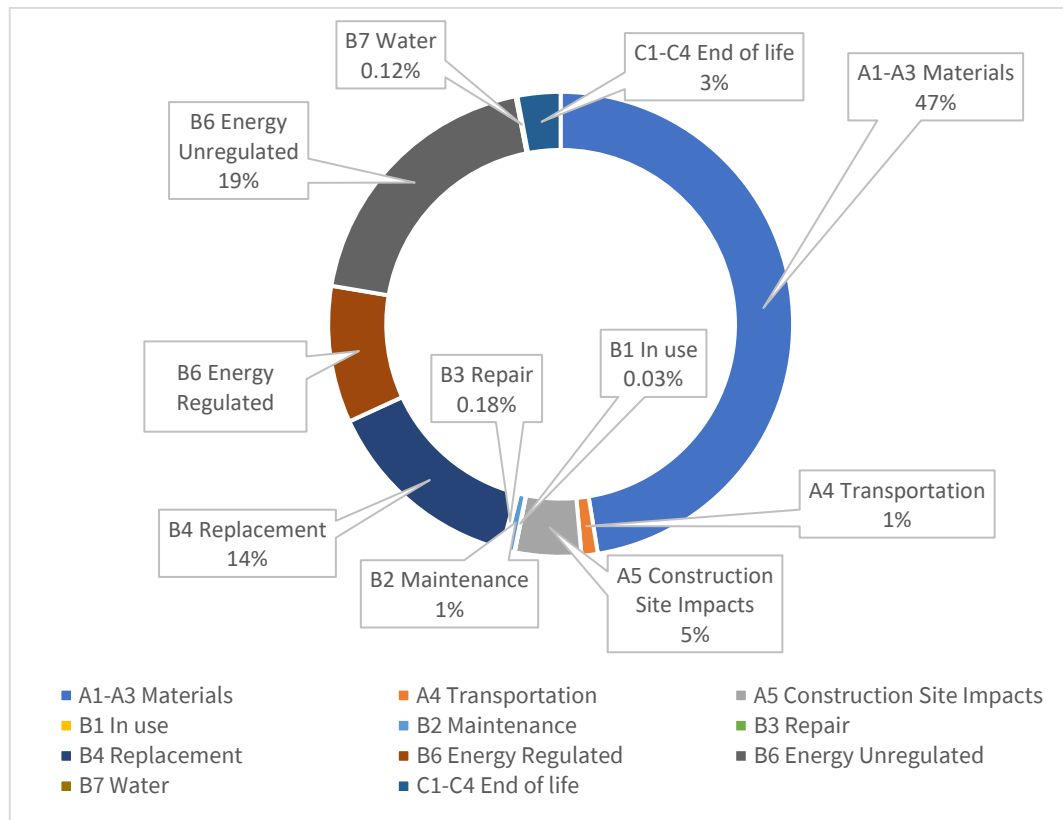


Figure 5: Total kgCO₂e - Life-cycle stages

6. MEASURES IMPLEMENTED AND OPPORTUNITIES

Measures Implemented

- 6.1** The proposed development has modelled potential measures throughout the design stage to further sustainability and reduce whole life carbon.
- 6.2** During Stage 2 of Phase 1B and 2, a study of different structural grids and framing materials was undertaken by the planning Structural Engineer (Price & Myers) using the PANDA analysis tool, which reports the costs and embodied carbon for multiple options. This results in a set of 'best-case' options for the specific project, rather than from a general database. In Phase 1, it was found that many forms of construction have similar embodied carbon values as a reinforced concrete frame and as such, this was proposed.

- 6.3 A series of further opportunities will also be explored during the next stage of design, these are outlined below.

Reduce material use

- 6.4 The **future demolition and deconstruction** of the development could be considered at the design stage. Consideration to be given to ways to facilitate dismantling, where possible.
- 6.5 Non-load bearing internal walls contribute material to the building that could otherwise be avoided. By **reducing the volume of non-load bearing walls** where possible, associated embodied carbon is also reduced.
- 6.6 The façade is under constant wear from the environment which can lead to frequent repairs and maintenance. By using **durable materials** for exposed elements, this not only reduces the cost and frequency of refurbishment but also reduces the use of material replacement and its associated carbon footprint.
- 6.7 Due to the high superstructure loads from RC frames, pad foundations have been deemed unfeasible. As a result, piled foundations are required for all RC frames. Where possible, the Structural Engineer will look to reduce the length of piled foundations in the next stage of the design to reduce the volume of concrete used to reduce the embodied carbon in the buildings.
- 6.8 Similarly, **an extensive maintenance and repair schedule** could also be produced during the design life of the development to ensure that specific materials and pieces of equipment are able to remain in situ during their expected lifespan. This will minimise the need to replace and refurbish and reduce emissions under life cycle stages C1-C4.
- 6.9 Management of municipal waste arisings from the development have been explored within the Circular Economy Statement (Hodkinson Consultancy, November 2023).

Recycled materials

- 6.10 Areas of hardstanding could make use of **recycled crushed concrete/gravel** to remove the associated carbon emissions from the assessment. These materials could similarly be recycled at the end-of-life scenario.
- 6.11 At end-of-life, **concrete can be completely recycled**. After demolition, concrete can be processed and used as recycled aggregate in fresh concrete. If the site is intended for new construction the demolished concrete can be crushed on-site and used onsite as hard core, fill, or in landscaping.

Re use of materials

- 6.12 The Circular Economy statement produced by Hodkinson Consultancy (November 2023) details the strategy for **recovery and reuse of materials**. Please refer to the report for further detail.

- 6.13** The pre-demolition audit has identified a large amount of concrete that could be crushed and re-used, included this material in the sub-structure could reduce A1-A3 emissions by up to 20kgCO₂/m².

Sustainable procurement

- 6.14** The transportation of materials from the manufacturing facility to the building site adds to the carbon of the development. Buying from **local sources or utilising off-site manufacturing processes** could help reduce the emissions produced during transportation. There is a balance to be struck between material transport and processes deployed in their manufacture. As such, details on this cannot be known until the detailed design phase. This review would impact life cycle A4 - emissions from transportation to site.
- 6.15** **Sustainable/natural insulation materials** have lower embodied carbon and often increase biogenic carbon storage, which reduces the overall emissions of the development.

7. CONCLUSION

- 7.1** This Whole Life Cycle Carbon Emissions (WLCCE) Assessment has been prepared for Phases 1B and 2 of St Ann's New Development, in the London Borough of Haringey. It has been prepared by Hodkinson Consultancy, a specialist energy and environmental consultancy for planning and development, appointed by the Client. The purpose of this WLCCE assessment is to demonstrate that the proposed development has undertaken an initial assessment based on the information available to date which will need to be updated as the project progresses.
- 7.2** The total emissions, based on the GLA guidance is **997 kgCO₂/m² GIA over 60 years.**
- > 745 kgCO₂/m² for modules A1-A5 (excluding sequestered carbon).
 - > 252 kgCO₂/m² for modules B-C.
- 7.3** When operational energy and water emissions are included in the calculation above the total emissions are expected to be **1,400 kgCO₂/m² GIA over 60 years.**
- 7.4** The expected WLLCE are lower than the GLA WLC Benchmark for all modules. This demonstrates that Phase 1B and 2 at St Ann's New Development have taken account of relevant policy and reduced emissions as far as reasonably possible and are therefore policy compliant.
- 7.5** A series of high-level opportunities to further reduce carbon emissions post planning have also been proposed. These measures will be looked at in detail in the next stage of the design development process and included, where possible.