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Selkirk House, 1 Museum Street, 10-12 Museum Street, 35 41 New Oxford Street and 16A 18 West Central Street, London, WC1A 1J R

LabTech Investments Limited

Whole Life Cycle Carbon Assessment

Rev 00

09/02/2021

Scotch Partners LLP
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Project Particulars

Client Name: LabTech Investments Limited

Project Name: Selkirk House, 1 Museum Street, 10-12 Museum Street, 35 41 New Oxford Street and 16A 18 West Central Street, London, WC1A 1J R

Project Number:

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Disclaimer

Revision History

Revision	Description	Date	Prepared By	Checked By
00	First Draft	09/01/2021	Danielle Lowson	Kirsten Elder
01	Second Draft	11/05/2021	Seb Dimarco	Danielle Lowson

Contents

List of Tables and Figures

1 Executive Summary

Scotch Partners LLP have been appointed to undertake a Whole Life Carbon (WLC) Assessment for the 1 Museum Street development in the London Borough of Camden.

The assessment has been undertaken in line with the guidance given in the draft guidance provided by the GLA in the Whole Life-Cycle Carbon Assessments guidance Pre-consultation draft, April 2020. This report should be read in conjunction with the GLA Whole Life Carbon Assessment Template issued in Microsoft Excel Format.

1.1 Estimated Whole Life Carbon Emissions

Table 1 Summary of Whole Life Carbon Emissions, using carbon factors from SAP10 and a decarbonised grid scenario.

Table 1 - Summary of Whole Life Carbon Emissions

Building Element	Assessment 1 (SAP 10) (kgCO2e)	Assessment 2 (Decarbonisation) (kgCO2e)
1 Substructure	6415758.22	6415758.22
2.1 – 2.4 Superstructure	8058768.05	8058768.05
2.5 – 2.6 Superstructure	5588277.89	5588277.89
2.7-2.8 Superstructure	44029.98	44029.98
Finishes	523710.69	523710.69
Fittings, furnishings and equipment	4700792.92	4700792.92
Services (MEP)	3886420.38	3886420.38
External Works	95193.22	95193.22
Site Energy and Water	76,251,829.99	59,651,387.99
Total kgCO2e	105,948,935.4	89,348,493.43

1.2 Energy Strategy

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

The energy strategy for the project is a key mechanism for reducing Whole Life Carbon of the development. A passive design strategy has been proposed, which features enhanced fabric elements for the proposed development with consideration for compatibility with the façade design and geometry, construction type and method.

1.3 Circular Economy

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

1.4 Conclusion

This report has set out the Whole Life Carbon emissions estimated for the site. This follows the GLA Whole Life-Cycle Carbon Assessments, Pre-consultation draft guidance, 2020.

2 Introduction

Scotch Partners have prepared this Whole Life Cycle Carbon Assessment on behalf of LabTech Investments Limited, referred to hereafter as “the Applicant”, in support of the outline planning application for the Selkirk House, 1 Museum Street, 10-12 Museum Street, 35 41 New Oxford Street and 16A 18 West Central Street development, and referred to hereafter as “the Site”.

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

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

2.1 Development Description

Redevelopment of Selkirk House, 166 High Holborn and 1 Museum Street following the substantial demolition of the existing NCP car park and former Travelodge Hotel to provide a mixed-use scheme, providing office, residential, and town centre uses at ground floor level. Works of demolition, remodelling and extension to 10-12 Museum Street, 35-41 New Oxford Street, and 16A-18 West Central Street to provide further town centre ground floor uses and residential floorspace, including affordable housing provision. Provision of new public realm including a new pedestrian route through the site to link West Central Street with High Holborn. Relocation of cycle hire docking stations on High Holborn

2.2 Background to whole life cycle assessments

Some studies have historically suggested that 10 – 20% of the total carbon emissions for buildings over their lifetime are due to embodied carbon. With increasing energy efficiency within buildings and an increasingly decarbonised electricity supply, building operational carbon emission are being acknowledged to be rapidly reducing. As this occurs, the significance of embodied carbon emissions increases and the potential for reduction of overall carbon emissions through structural design choice and material selection becomes greater. The WLC Emissions are those emissions resulting from the construction and use of a building over its entire life, including its demolition and disposal. Calculating the WLC emissions will provide a capture of the buildings operational carbon emissions (from both regulated and unregulated energy use) as week as the embodied carbon emissions.

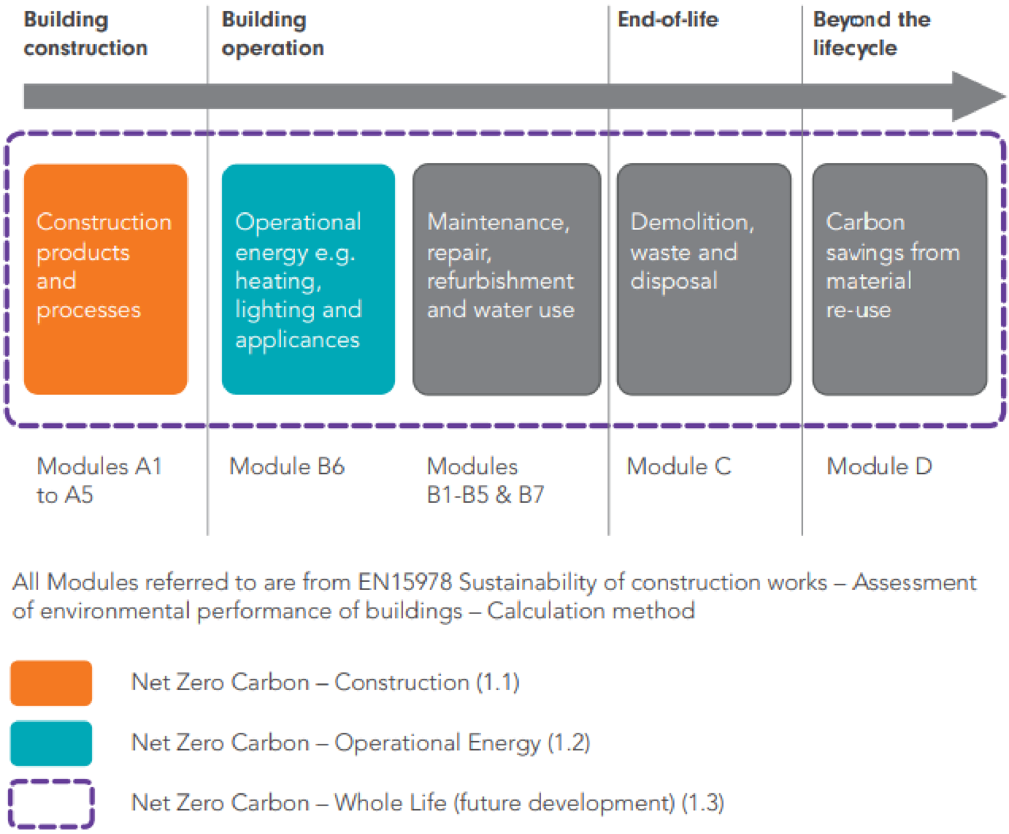
2.3 RICS Whole Life Carbon

The RICS professional statement: Whole Life Carbon Assessment (WLC) for the Build Environment, released in 2017, seeks to standardise WLC assessment and enhance consistency in outputs by providing guidance on implementing the broad appraisal methodology set out in EN 15978: Sustainability of Construction Works. The Greater London Authority have adopted the RICS WLC methodology in their guidance methodology for Whole Life Carbon assessment of referable planning applications.

2.4 UK Green Building Council (GBC) Net Zero Carbon

As part of the definition of Net Zero, the UK Green Building Council has developed a Framework Definition that includes embodied carbon emissions, and this definition is widely being used to develop a roadmap to the 2050 Net Zero target.

Figure 1 - UKGBC Advancing Net Zero Carbon Framework Approach



2.5 The Circular Economy

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

3 Methodology

3.1 Assessment Scope

The assessment of Whole Life Carbon (WLC) emissions consists of the following sections: total operational carbon emissions (regulated plus unregulated); embodied carbon emissions; and any future potential carbon emissions 'benefits', post end-of-life, including benefits from reuse and recycling of building structure and materials.

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

Operational Carbon Emissions

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

Embodied Carbon Assessment and end of life emissions

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

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

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

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

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

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

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

3.2 Life Cycle Assessment Impacts

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

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

This assessment thus reports on the embodied carbon of the development as 'global warming potential' with the annotation 'CO2 equivalent (CO2e)'.

3.3 Data Sources

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

Table 2 - Types of data required for a WLC assessment

Quantity Data	Material Data	Comments	Provided by
Cost Plan	Cost Plan	Cost plans can be useful for calculation of uncertain quantities which are not product specific, however often an allowance is made at early design stages which may reduce accuracy.	
Architectural Drawings and Area Schedule	Architecture Build-up	A more traditional and slower approach to determining quantity of building elements, if build-ups are available to support.	DSDHA Architects (Project Architect) EOC Engineers (Façade)
Structural Drawings and Schedule	Structural Layouts		Meindhart (Structural Engineers)
Mechanical and Electrical Schedules	M&E Specifications		Scotch Partners (M&E)

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

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

3.4 Current and Future Carbon Emissions

In line with the guidance given in the draft GLA guidance to Whole Life Carbon assessments, the assessment has been undertaken based on two sets of carbon emissions:

3.4.1 SAP 10

The first set of figures is based on the current status of the electricity grid and provides a point-in-time assessment. For materials manufactured in the UK, SAP 10 emission factors are used in line with the GLA's Energy Assessment Guidance. Products sourced from outside the UK use data appropriate to the local energy grid at that location. This set of figures is used in the comparison to the WLC benchmarks.

3.4.2 Decarbonisation

It is also important to consider the potential longer-term decarbonisation of the electricity grid and how this may impact on design decisions. The second set of figures is therefore based on the expected decarbonisation of the electricity grid over the lifetime of the development (i.e. 60 years).

The RICS WLC guidance (2017) and the GLA WLC guidance (2020) documents makes reference to use of the "slow progression' scenario from the latest Future Energy Scenarios (FES) developed by the National Grid and makes reference to the 2015 edition of FES.

This edition has been revised each year, with the latest edition 2019 accounting for more recent developments in the future performance of the National Grid. As noted in Figure 5, the actual performance of the national grid (black line) deviated from the FES 2016 'Slow Progression' scenario and is inaccurate.

Therefore, for this Whole Life Carbon Assessment, the National Grid's 2019 edition of the 'Steady Progression' scenario was chosen as this more closely maps the departments of Business Energy and Industrial Strategy (BEIS) declared grid carbon projection.

3.5 Context of grid carbonisation projections

The Future Energy Scenarios (FES) document, produced by the National Grid, discusses how the UK's energy landscape is changing. FES 2020 makes projections of how the mix of generation in the grid is likely to change between now and 2050 – the year by which the Climate Change Act 2008 set the target of reducing the UK's CO2 emissions by 80% from 1990 levels. This target has now been revised to be Net Zero in light of the Committee on Climate Change's recent report and the declaration of a Climate Emergency.

FES discusses these projections in one of four scenarios and Figure 6 combines these future trajectories with the actual carbon intensity of the National Grid over the past 13 years. The reported emissions associated with electricity generation have fallen steeply since 2012 and in all cases, the FES 2018 scenarios see the carbon factor of electricity fall below 100 gCO2/kWh by 2035.

3.5.1 Shifting Focus

As the carbon emissions associated with the generation of electricity continue to reduce, the proportion of the UK's overall greenhouse gas emissions for which the electricity sector is responsible will fall. In fact, transport has now replaced energy supply as the greatest single contributor, responsible for 26% of national greenhouse gas emissions (BEIS).

The carbon factor of natural gas is likely to remain relatively static. With 85% of homes in the UK relying on gas to supply their heating and hot water, as well as a significant proportion of commercial buildings, heating buildings and industry represents an ever-greater proportion of UK emissions – 32% in 2015 (BEIS). In order for the UK to maintain a trajectory sufficient to meet the 2050 decarbonisation target, focus must necessarily shift to other contributors.

The BEIS Clean Growth Strategy provides an indication of the direction the UK's energy policy is likely to take and "…sets out [the government's] proposals for decarbonising all sectors of the UK economy through the 2020s." This includes investing in infrastructure and mechanisms to facilitate a transition to low emission vehicles and strengthening the energy performance requirements of new and existing buildings.

4 Results

4.1 Embodied Carbon Emissions

The embodied carbon emissions for the development include use stages A1-A5. The results of which are displayed in Table 3 below.

Table 3- Embodied Carbon Results

Module	Module Description	Totals (KgCO2)
A1-A3	Product Stages	16,274,241
A4	Transport of Equipment and Materials	2,539,532
A5	Construction	1,036,655
	Total	**19,859,428**

The results of the Whole Life Carbon assessment displayed a total KgCO2e for the embodied carbon stages at 19,859,428 KgCO2e. This was dominated by the Product Stages (Modules A1-A3) with 16,274,241 KgCO2e.

4.2 Operational Carbon Emissions

Table 4- Operational Carbon Emissions Results

Category	Assessment 1 (SAP 10) (kgCO2e)	Assessment 2 (Decarbonisation) (kgCO2e)
Operational Energy	75,665,398	59,064,956
Operational Water	586,431	586,431
Total	**76,251,829.99**	**59,651,387.99**

The Operational Carbon emissions, summarised in Table 4, displays the differences between the two assessments. Assessment 2, based on the decarbonisation of the grid, displays a 21.78% drop in emissions for the operational stages compared to Assessment 1, based on SAP10 emissions.

4.3 Assessment 1 – Estimated Whole Life Carbon (WLC) Emissions

Table 5- Assessment 1 WLC Results

Module	Module Description	Totals (KgCO2)
A1-A3	Product Stages	16,274,241
A4	Transport of Equipment and Materials	2,539,532
A5	Construction	1,036,655
B1	Use	-9,255
B2B3	Maintenance and Repair	493,808
B4B5	Replacement and Refurbishment	6,987,867
B6	Operational Energy Use	75,665,398
B7	Operational Water Use	586,431
C	End Of Life	2,316,278

D	Benefits and Loads beyond the System Boundary	-134,110
	Total	**105,948,935.43**

Assessment 1 resulted in a total WLC emissions of 105,948,935.43 KgCO2e as displayed in Table 5. The table displays the breakdown in the different Modules, with the Operational Energy Module displaying the highest emissions with 75,665,398 KgCO2e, followed by the Product Stages with 16,274,241 KgCO2e.

4.4 Assessment 2 – Estimated Whole Life Carbon (WLC) Emissions (decarbonisation)

Table 6- Assessment 2 WLC Results

Module	Module Description	Totals (KgCO2)
A1-A3	Product Stages	16,274,241
A4	Transport of Equipment and Materials	2,539,532
A5	Construction	1,036,655
B1	Use	-9,255
B2B3	Maintenance and Repair	493,808
B4B5	Replacement and Refurbishment	6,987,867
B6	Operational Energy Use	59,064,956
B7	Operational Water Use	586,431
C	End Of Life	2,316,278
D	Benefits and Loads beyond the System Boundary	-134,110
	Total	89,348,493.43

Assessment 2 resulted in a total WLC emissions of 89,348,493.43 KgCO2e as displayed in Table 5. The table displays the breakdown in the different Modules, with the Operational Energy Module displaying the highest emissions with 59,064,956 KgCO2e, followed by the Product Stages with 16,274,241 KgCO2e.

5 Opportunities for reducing WLC

5.1 Maximise Recycled Content

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

5.2 Influence of Product Specification

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

5.3 Actions Taken to Reduce Whole Life-Cycle Carbon Emissions

5.3.1 Energy Strategy

Primarily, the energy strategy for the project is a key mechanism for reducing whole life carbon of the development. In addition to a passive design approach, an 'all electric' energy strategy has been proposed, which features highly efficient heat pumps to deliver heating and hot water throughout the development. In addition to heat pumps working at greater efficiency than gas boilers, the heat pumps can take advantage of the projected decarbonisation of the national grid (previously discussed), and therefore is expected to be lower in whole life carbon terms than traditional gas boiler servicing strategy.

Comparing Assessment 1 (SAP10) and Assessment 2 (with decarbonisation) a 16,600,442 kgCO2e difference is estimated, representing 15.7% less reported for Assessment 2 compared to Assessment 1. This reinforces the use of projected decarbonisation scenarios in Whole Life Carbon assessments as proposed by the RICS Professional Statement for Whole Life Carbon Assessment. Due to the nature of the assessment, the difference between the two assessments is shown in the B6 Operational Energy Stage, owing to the decarbonisation of the grid in comparison of the two assessments.

5.3.2 Re-use and recovery

The Circular Economy statement details the strategy for recovery of materials in line with the circular economy model. The benefits of recovered materials have not been accounted for in the Whole Life Carbon Assessment at this stage due uncertainty in the quantity of replacement materials. It is understood that this would be accounted for at a more detailed stage of design when more accurate data is available.

6 Conclusion

This report sets out the Whole Life Carbon emissions estimated for the site. Table 7 below summarises the total Whole Life Carbon emissions estimated for the two assessments.

Table 7- Summary of Results

Whole Life Carbon Scope	RICS Whole Life Carbon Emissions (kgCO2e)
Assessment 1: SAP10	105,948,935.43
Assessment 2: Decarbonisation Projection	89,348,493.43

The life cycle module that constitutes the greatest proportion of the total Whole Life Carbon emissions of the development is Module B6: Operational Energy use at 71.5% of the total Whole Life Carbon emissions. The next highest category is the Product Stage (Modules A1-A3) with 15.4%.

By accounting for decarbonisation of the UK grid electricity (Assessment 2), the emissions from module B6: Operational energy is reduced from 71.5% to 66.2% (as a proportion of Whole Life Carbon). This is significant and confirms the importance of considering grid decarbonisation when completing carbon emissions assessments on a whole life basis.

It is worthy to note that the life cycle emissions from the Use & Replacement (B1-B7) and End of Life stages (C1-C4) will also benefit from future decarbonisation of the UK, European and Global supply chains, however the method for more accurately accounting for these life cycle stages requires further development.

Appendix 1- GLA WLC Assessment Spreadsheet

Project details	
Project name	Selkirk House, 1 Museum Street, 10-12 Museum Street, 35 41 New Oxford Street and 16A 18 West Central Street, London, WC1A 1J R
Planning application reference number (if applicable)	
Use Type	A1, B1, C2
Brief description of the project	Redevelopment of Selkirk House, 166 High Holborn and 1 Museum Street following the substantial demolition of the existing NCP car park and former Travelodge Hotel to provide a mixed-use scheme, providing office, residential, and town centre uses at ground floor level. Works of demolition, remodelling and extension to 10-12 Museum Street, 35-41 New Oxford Street, and 16A-18 West Central Street to provide
GIA (m^2)	30267
Authors (organisation or individuals)	Scotch Partners
Date of assessment	30/04/2021
Nationally recognised assessment method used	BS EN 15978, with additional guidance from RICS Professional Statement
Reference study period (if not 60 years)	[This cell should only be filled in if the reference study period, i.e. the assumed building life expectancy, exceeds or is less than 60 years. Applicants should state the reference study period in this cell. While the assessment should still be done to 60 years, applicants may, if they choose to, submit an additional assessment of the modules B, C and D for the actual reference study period by copying and pasting an additional 'GWP potential for all life-cycle modules' table, see below].
Software tool used	eTool LCA
Source of carbon data for materials and products	eTool database
EPD database used	[If using more than one database please list all]

Estimated WLC emissions (Assessment 1)
N.B. This forms the WLC baseline for the development. The results from Assessment 1 below are automatically populated here.

	Module A1-A5	Module B1-B5	Module B6-B7	Module C1-C4	Module D
TOTAL kg CO_2e	19,850,427 kg CO2e	7,472,420 kg CO2e	76,251,829 kg CO2e	2,316,278 kg CO2e	-134,110 kg CO2e
TOTAL kg CO_2e/m^2 GIA	655.8438831	246.8833958	2519.305811	76.52817326	-4.43069966
Comparison with WLC benchmarks (see Appendix 2 of the guidance) if Assessment 1 was used to inform design decisions	[Explain the reasons for any divergences from WLC benchmarks, including against the WLC aspirational benchmarks]				

Estimated WLC emissions (Assessment 2)
N.B. The results from Assessment 2 below are automatically populated here.

	Module A1-A5	Module B1-B5	Module B6-B7	Module C1-C4	Module D
TOTAL kg CO_2e	19,850,427 kg CO2e	7,472,420 kg CO2e	59,651,387 kg CO2e	2,316,278 kg CO2e	-134,110 kg CO2e
TOTAL kg CO_2e/m^2 GIA	655.8438831	246.8833958	1970.839098	76.52817326	-4.43069966
Comparison with WLC benchmarks (see Appendix 2 of the guidance) if Assessment 2 was used to inform design decisions	[Explain the reasons for any divergences from WLC benchmarks, including against the WLC aspirational benchmarks. Please note that grid decarbonisation has not been accounted for in the benchmarks]				

Key site opportunities and constraints in reducing WLC emissions	The site is restricted in footprint. Key opportunity is in the review of materials assumed at stage 2 design during the detail design stages.

	Action	WLC reduction (kg CO_2e/m^2 GIA)
Summary of key actions to reduce whole life-cycle carbon emissions that have informed this assessment, including the WLC reductions	Limited actions available at this stage, to be developed as design progresses.	
	In-situ poured concrete prefered where possible	
	Material efficiency prioritised in design to reduce emissions	

	Further potential opportunities	WLC reduction potential (kg CO_2e/m^2 GIA)
Specify further opportunities to reduce the development's whole life-cycle carbon emissions, including the WLC reduction potential	Further reduction in operational energy consumption	
	Further reduction in water usage	
	Further LCA study planned for Stage 4 to further optioneer LCA options	
	Commitment to recycling of goods at end of use	
	Increase in recycled materials	

MATERIAL QUANTITY AND END OF LIFE SCENARIOS		Product and Construction Stage (Module A)		Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of life' scenarios (Module C)	Benefits and loads beyond the system boundary (Module D)	
Building element category		Material type	Material quantity (kg)			Estimated reusable materials (kg)	Estimated recyclable materials (kg)
	Note/example	Breakdown of material type in each category [insert more lines if needed] e.g. Concrete	65000 kg	For all primary building systems (structure, substructure, envelope, MEP services, internal finishes)	Declare 'end of life' scenario as per project's Circular Economy Statement	0 kg	25 kg
		e.g. Reinforcement	5000 kg			2 kg	8 kg
		e.g. Formwork	250 kg			0 kg	0 kg
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment						
0.2	Major Demolition Works						
0.3	Temporary Support to Adjacent Structures						
0.4	Specialist Ground Works						
1	Substructure	Concrete	14,269 kg	150 years product life.	Can be recycled at end of life		14,269 kg
		Timber	376 kg	200 year product life	Can be recycled at end of life		376 kg
		Steel	147,884 kg	150 years product life.	Can be recycled at end of life		147,884 kg
		Adhesive	10 kg	110 years product life	Can not be recycled at the end of life		
		Plastic	0 kg	50 years product life	Can be recycled at end of life		0 kg
2.1	Superstructure: Frame	Concrete	4,002 kg	150 years product life.	Can be recycled at end of life		4,002 kg
		Timber	56 kg	200 year product life	Can be recycled at end of life		56 kg
		Steel	346 kg	150 years product life.	Can be recycled at end of life		346 kg
2.2	Superstructure: Upper Floors	timber	81 kg	200 year product life	Can be recycled at end of life		81 kg
		concrete	9,756 kg	150 years product life.	Can be recycled at end of life		9,756 kg
		steel	95 kg	150 years product life.	Can be recycled at end of life		95 kg
2.3	Superstructure: Roof	Asphalt	3 kg		Can be recycled at end of life		3 kg
		Insulation	11 kg	80 years product life	Difficult to recycle at the end of life		
		Plastic	5 kg	50 years product life	Can be recycled at end of life		5 kg
		Aggregate	244 kg		Can be recycled at end of life		244 kg
		Aluminium	2 kg	80 years product life	Can be recycled at end of life		2 kg
		adhesive	1 kg	40 years product life	Can not be recycled at the end of life		
		concrete	449 kg	150 years product life.	Can be recycled at end of life		449 kg
		timber	7 kg	200 year product life	Can be recycled at end of life		7 kg
		steel	2 kg	150 years product life.	Can be recycled at end of life		2 kg
2.4	Superstructure: Stairs and Ramps	concrete	296 kg	150 years product life.	Can be recycled at end of life		296 kg
		steel	1 kg	150 years product life.	Can be recycled at end of life		1 kg
		timber	4 kg	200 year product life	Can be recycled at end of life		4 kg
2.5	Superstructure: External Walls	Steel	48 kg	150 years product life.	Can be recycled at end of life		48 kg
		Concrete	4,400 kg	150 years product life.	Can be recycled at end of life		4,400 kg
		Plastic	59 kg	50 years product life	Can be recycled at end of life		59 kg
		Fibreglass	8 kg	50 years product life	Can be recycled at end of life		8 kg
		Insulation	16 kg	80 years product life	Difficult to recycle at the end of life		
		Plaster	101 kg	55 years product life	Can be recycled at end of life		101 kg
		paint	1 kg	10 years product life	Can not be recycled at the end of life		
		adhesive	0 kg	40 years product life	Can not be recycled at the end of life		
		bricks	101 kg	110 years product life	Can be recycled or reused at the end of life	101 kg	
		aluminium	15 kg	80 years product life	Can be recycled at end of life		15 kg
		timber	82 kg	200 year product life	Can be recycled at end of life		82 kg
		plasterboard	1 kg	55 years product life	Can be recycled at end of life		1 kg
2.6	Superstructure: Windows and External Doors	glazing	73 kg	150 years product life	Can be recycled at end of life		73 kg
		Aluminium	5 kg	80 years product life	Can be recycled at end of life		5 kg
		steel	0 kg	150 years product life.	Can be recycled at end of life		0 kg
		timber	1 kg	200 year product life	Can be recycled at end of life		1 kg
		Insulation	0 kg	80 years product life	Difficult to recycle at the end of life		
2.7	Superstructure: Internal Walls and Partitions	plaster	303 kg	55 years product life	Can be recycled at end of life		303 kg
		concrete	4,465 kg	150 years product life.	Can be recycled at end of life		4,465 kg
		aluminium	4 kg	80 years product life	Can be recycled at end of life		4 kg
		paint	13 kg	10 years product life	Can not be recycled at the end of life		
		plastics	0 kg	50 years product life	Can be recycled at end of life		0 kg
		insulation	2 kg	80 years product life	Difficult to recycle at the end of life		
		plasterboard	110 kg	55 years product life	Can be recycled at end of life		110 kg
		timber	18 kg	200 year product life	Can be recycled at end of life		18 kg
2.8	Superstructure: Internal Doors	steel	0 kg	150 years product life.	Can be recycled at end of life		0 kg
3	Finishes	Paint	5 kg	10 years product life	Can not be recycled at the end of life		
		Concrete	9 kg	150 years product life.	Can be recycled at end of life		9 kg
		Plaster	169 kg	55 years product life	Can be recycled at end of life		169 kg
		Timber	4 kg	200 year product life	Can be recycled at end of life		4 kg
		Carpet	0 kg	50 years product life	Can be recycled or reused at the end of life		0 kg
4	Fittings, furnishings & equipment (FFE)	steel	1 kg	150 years product life.	Can be recycled at end of life		1 kg
		fibreglass	458 kg	50 years product life	Can be recycled at end of life		458 kg
		plastic	22 kg	50 years product life	Can be recycled at end of life		22 kg
		adhesive	7 kg	40 years product life	Can not be recycled at the end of life		
5	Services (MEP)	steel	4 kg	150 years product life.	Can be recycled at end of life		4 kg
		Refrigerants	1 kg	20 years product life	Can not be recycled at the end of life		
		Insulation	1 kg	80 years product life	Difficult to recycle at the end of life		
		copper	25 kg	20 years product life	Can be recycled at end of life		25 kg
		Plastic	13 kg	20 years product life	Can be recycled at end of life		13 kg
		rubber	13 kg	20 years product life	Can be recycled at end of life		13 kg
		electrical equipt	13 kg	15 years product life	Can be recycled or reused at the end of life	13 kg	
		Brass	1 kg	20 years product life	Can be recycled at end of life		1 kg
		Concrete	113 kg	150 years product life.	Can be recycled at end of life		113 kg
6	Prefabricated Buildings and Building Units	Aluminium	0 kg	80 years product life	Can be recycled at end of life		0 kg
7	Work to Existing Building						
8	External works	Steel	2 kg	150 years product life.	Can be recycled at end of life		2 kg
		Timber	55 kg	200 year product life	Can be recycled at end of life		55 kg
		Concrete	2,369 kg	150 years product life.	Can be recycled at end of life		2,369 kg
		Brick	746 kg	151 years product life.	Can be recycled or reused at the end of life	746 kg	
		Aggregate	959 kg	30 years product life	Can be recycled at end of life		959 kg
		Asphalt	7 kg	80 years product life	Can be recycled at end of life		7 kg
		TOTAL	188,589 kg			114 kg	188,408 kg
		Material intensity (kg/m2 GIA)	6 kg/m2 GIA			0 kg/m2 GIA	6 kg/m2 GIA

Confirm here whether Assessment 1 or Assessment 2 (see below) is to form the basis of design decisions	Assessment 1

ASSESSMENT 1 - current status of the electricity grid

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES (kgCO2e)		Sequestered (or biogenic) carbon (negative value) (kgCO2e)	Product stage (kgCO2e)	Construction process stage (kgCO2e)		Use stage (kgCO2e)							End of Life (EoL) stage (kgCO2e)				TOTAL Modules A-C (kgCO2e)	Benefits and loads beyond the system boundary (kgCO2e)
				Module A		Module B							Module C					Module D*
Building element category			[A1] to [A3]	[A4]*	[A5]	[B1]	[B2]*	[B3]*	[B4]*	[B5]*	[B6]	[B7]	[C1]	[C2]	[C3]	[C4]		
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
0.2	Major Demolition Works													########	0 kg CO2e	0 kg CO2e	193,079 kg CO2e	0 kg CO2e
0.3	Temporary Support to Adjacent Structures													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
0.4	Specialist Ground Works													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
0.5	Temporary Diversion Works													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
1	Substructure		4,431,180 kg CO2e	758,208 kg CO2e	306,484 kg CO2e	-7,828 kg CO2e	0 kg CO2e		288 kg CO2e					########	########	########	########	167,475 kg CO2e
2.1	Superstructure: Frame		4,987,423 kg CO2e	828,872 kg CO2e	417,813 kg CO2e	0 kg CO2e	280 kg CO2e		17,852 kg CO2e					########	########	########	########	-287,144 kg CO2e
2.2	Superstructure: Upper Floors		1,788,820 kg CO2e	174,411 kg CO2e	22,281 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					########	########	########	########	74,846 kg CO2e
2.3	Superstructure: Roof		85,242 kg CO2e	22,724 kg CO2e	2,086 kg CO2e	0 kg CO2e	18,078 kg CO2e		31,882 kg CO2e					########	########	########	172,384 kg CO2e	865 kg CO2e
2.4	Superstructure: Stairs and Ramps		60,880 kg CO2e	8,248 kg CO2e	1,473 kg CO2e	0 kg CO2e	0 kg CO2e		1,277 kg CO2e					########	########	########	79,306 kg CO2e	858 kg CO2e
2.5	Superstructure: External Walls		2,447,411 kg CO2e	508,184 kg CO2e	140,420 kg CO2e	0 kg CO2e	8 kg CO2e		883,813 kg CO2e					########	########	########	########	-884 kg CO2e
2.6	Superstructure: Windows and External Doors		498,850 kg CO2e	188,081 kg CO2e	7,420 kg CO2e	0 kg CO2e	13,073 kg CO2e		888,202 kg CO2e					########	########	########	########	-8,821 kg CO2e
2.7	Superstructure: Internal Walls and Partitions		28,288 kg CO2e	7,038 kg CO2e	4,081 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					########	########	########	48,353 kg CO2e	-4,483 kg CO2e
2.8	Superstructure: Internal Doors		1,130 kg CO2e	372 kg CO2e	173 kg CO2e	3 kg CO2e	4 kg CO2e		0 kg CO2e					########	0 kg CO2e	########	2,780 kg CO2e	-883 kg CO2e
3	Finishes		148,728 kg CO2e	88,408 kg CO2e	8,471 kg CO2e	0 kg CO2e	0 kg CO2e		282,707 kg CO2e					########	########	########	203,078 kg CO2e	833 kg CO2e
4	Fittings, furnishings & equipment		1,283,288 kg CO2e	183,884 kg CO2e	71,881 kg CO2e	0 kg CO2e	0 kg CO2e		3,210,788 kg CO2e					########	########	########	########	-12,887 kg CO2e
5	Services (MEP)		824,228 kg CO2e	82,141 kg CO2e	44,729 kg CO2e	-1,731 kg CO2e	483,288 kg CO2e		2,270,834 kg CO2e		73,695,386 kg CO2e 0 kg CO2e	888,431 kg CO2e		########	########	########	########	-85,498 kg CO2e
6	Prefabricated Buildings and Building Units		0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
7	Work to Existing Building		0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
8	External works		28,878 kg CO2e	28,298 kg CO2e	10,883 kg CO2e	0 kg CO2e	0 kg CO2e		20,088 kg CO2e					########	########	########	83,348 kg CO2e	1,847 kg CO2e
TOTAL kg CO2e		0 kg CO2e	18,274,241 kg CO2e	2,838,832 kg CO2e	1,088,888 kg CO2e	-8,288 kg CO2e	483,808 kg CO2e	0 kg CO2e	6,887,887 kg CO2e	0 kg CO2e	73,695,386 kg CO2e	888,431 kg CO2e	0 kg CO2e	########	########	########	########	-184,110 kg CO2e
TOTAL - kg CO2e/m2 GIA		0 kg CO2e/m2 GIA	888 kg CO2e/m2 GIA	88 kg CO2e/m2 GIA	34 kg CO2e/m2 GIA	0 kg CO2e/m2 GIA	########	0 kg CO2e/m2 GIA	201 kg CO2e/m2 GIA	0 kg CO2e/m2 GIA	2,800 kg CO2e/m2 GIA	18 kg CO2e/m2 GIA	########	########	########	########	########	-4 kg CO2e/m2 GIA

Notes:
* Report non-decarbonised values for both material and operational emissions using current status of the electricity grid.
* If you have entered a reference study period in cell C10 because the assumed building life expectancy is greater or less than 60 years, this table should be copied and pasted below using the actual assumed life expectancy. This should be done for both GWP reporting tables and should be clearly labeled.
* Use the 'European manufactured' transportation scenarios (see Table 7, case 13 of the RICS PS) to calculate transportation emissions of MEP equipment.

	Mandatory cells for completion
	N/A

ASSESSMENT 2 - expected decarbonisation of the electricity grid

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES (kgCO2e)		Sequestered (or biogenic) carbon (negative value) (kgCO2e)	Product stage (kgCO2e)	Construction process stage (kgCO2e)		Use stage (kgCO2e)							End of Life (EoL) stage (kgCO2e)				TOTAL Modules A-C (kgCO2e)	Benefits and loads beyond the system boundary (kgCO2e)
				Module A		Module B							Module C					Module D*
Building element category			[A1] to [A3]	[A4]*	[A5]	[B1]	[B2]*	[B3]*	[B4]*	[B5]*	[B6]	[B7]	[C1]	[C2]	[C3]	[C4]		
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
0.2	Major Demolition Works													########	0 kg CO2e	0 kg CO2e	193,079 kg CO2e	0 kg CO2e
0.3	Temporary Support to Adjacent Structures													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
0.4	Specialist Ground Works													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
0.5	Temporary Diversion Works													0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
1	Substructure		4,431,180 kg CO2e	758,208 kg CO2e	306,484 kg CO2e	-7,828 kg CO2e	0 kg CO2e		288 kg CO2e					########	########	########	########	167,475 kg CO2e
2.1	Superstructure: Frame		4,987,423 kg CO2e	828,872 kg CO2e	417,813 kg CO2e	0 kg CO2e	280 kg CO2e		17,852 kg CO2e					########	########	########	########	-287,144 kg CO2e
2.2	Superstructure: Upper Floors		1,788,820 kg CO2e	174,411 kg CO2e	22,281 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					########	########	########	########	74,846 kg CO2e
2.3	Superstructure: Roof		85,242 kg CO2e	22,724 kg CO2e	2,086 kg CO2e	0 kg CO2e	18,078 kg CO2e		31,882 kg CO2e					########	########	########	172,384 kg CO2e	865 kg CO2e
2.4	Superstructure: Stairs and Ramps		60,880 kg CO2e	8,248 kg CO2e	1,473 kg CO2e	0 kg CO2e	0 kg CO2e		1,277 kg CO2e					########	########	########	79,306 kg CO2e	858 kg CO2e
2.5	Superstructure: External Walls		2,447,411 kg CO2e	508,184 kg CO2e	140,420 kg CO2e	0 kg CO2e	8 kg CO2e		883,813 kg CO2e					########	########	########	########	-884 kg CO2e
2.6	Superstructure: Windows and External Doors		498,850 kg CO2e	188,081 kg CO2e	7,420 kg CO2e	0 kg CO2e	13,073 kg CO2e		888,202 kg CO2e					########	########	########	########	-8,821 kg CO2e
2.7	Superstructure: Internal Walls and Partitions		28,288 kg CO2e	7,038 kg CO2e	4,081 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					########	########	########	48,353 kg CO2e	-4,483 kg CO2e
2.8	Superstructure: Internal Doors		1,130 kg CO2e	372 kg CO2e	173 kg CO2e	3 kg CO2e	4 kg CO2e		0 kg CO2e					########	0 kg CO2e	########	2,780 kg CO2e	-883 kg CO2e
3	Finishes		148,728 kg CO2e	88,408 kg CO2e	8,471 kg CO2e	0 kg CO2e	0 kg CO2e		282,707 kg CO2e					########	########	########	203,078 kg CO2e	833 kg CO2e
4	Fittings, furnishings & equipment		1,283,288 kg CO2e	183,884 kg CO2e	71,881 kg CO2e	0 kg CO2e	0 kg CO2e		3,210,788 kg CO2e					########	########	########	########	-12,887 kg CO2e
5	Services (MEP)		824,228 kg CO2e	82,141 kg CO2e	44,729 kg CO2e	-1,731 kg CO2e	483,288 kg CO2e		2,270,834 kg CO2e		59,044,898 kg CO2e 0 kg CO2e	888,431 kg CO2e		########	########	########	########	-85,498 kg CO2e
6	Prefabricated Buildings and Building Units		0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
7	Work to Existing Building		0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e		0 kg CO2e					0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e	0 kg CO2e
8	External works		28,878 kg CO2e	28,298 kg CO2e	10,883 kg CO2e	0 kg CO2e	0 kg CO2e		20,088 kg CO2e					########	########	########	83,348 kg CO2e	1,847 kg CO2e
TOTAL kg CO2e		0 kg CO2e	18,274,241 kg CO2e	2,838,832 kg CO2e	1,088,888 kg CO2e	-8,288 kg CO2e	483,808 kg CO2e	0 kg CO2e	6,887,887 kg CO2e	0 kg CO2e	59,044,898 kg CO2e	888,431 kg CO2e	0 kg CO2e	########	########	########	########	-184,110 kg CO2e
TOTAL - kg CO2e/m2 GIA		0 kg CO2e/m2 GIA	888 kg CO2e/m2 GIA	88 kg CO2e/m2 GIA	34 kg CO2e/m2 GIA	0 kg CO2e/m2 GIA	########	0 kg CO2e/m2 GIA	201 kg CO2e/m2 GIA	0 kg CO2e/m2 GIA	1,881 kg CO2e/m2 GIA	18 kg CO2e/m2 GIA	########	########	########	########	########	-4 kg CO2e/m2 GIA

Notes:
* Report decarbonised values for both material and operational emissions using expected decarbonisation of the electricity grid.
* If you have entered a reference study period in cell C10 because the assumed building life expectancy is greater or less than 60 years, this table should be copied and pasted below using the actual assumed life expectancy. This should be done for both GWP reporting tables and should be clearly labeled.

	Mandatory cells for completion
	N/A

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