BP FINCHLEY ROAD

WHOLE LIFE CARBON ASSESSMENT

ISSUE AND REVISION RECORD

Revision	Date	Originator	Checked	Approved	Description
01	15/08/22	FH	JALW	JALW	Issued for Planning

CONTENTS

EXECUTIVE SUMMARY

This report has been produced by WME to support the planning application for the proposed development at 104A Finchley Road.

The proposals are for the Demolition of existing petrol filling station and associated convenience store (sui generis), and erection of a six-storey building comprising ground floor commercial space (Class E) and flexible commercial/educational space (Class E/F1), and 31 x residential apartments above.

Whilst the planning application is not GLA referrable, early discussions with the planners concluded that it was not possible to retain the existing building and as such, it is a requirement of Camden Planning Council to submit a Whole Life Carbon assessment in line with Chapter 9 of the CPG energy efficiency and adaption document.

A Whole Life Carbon Assessment has been undertaken using OneClick software.

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, a strategy has been proposed which features highly efficient ambient loop 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. Refer to Energy Statement report (P150051-RPT-8001 Energy Statement) for full details on the proposed Energy Strategy.

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. Refer to Circular Economy Statement (P150051-RPT-8003 Circular Economy Statement) for full details on Circular Economy.

The following results summarise the embodied WLC emissions for the scheme. These results encompass the scope of inclusions and exclusions detailed within the document and are derived using the full OneClick material component database.

Modules	KgCOe	KgCO2/m2
A1 – A5	1987378.3	535.68
B1 – B6	443364.44	119.51
C1 – C4	50680.12	13.66
		668.85

Note: All results presented within this document should NOT be taken as final. These are based on the limited information available to date and will be updated regularly as the design progresses.

INTRODUCTION

WME have been appointed to undertake a Whole Life Carbon (WLC) Assessment for the 104a Finchley Road in London. The following document is aligned with the accompanying planning application submission documents and has been carried in line with Chapter 9 of the CPG energy efficiency and adaption document and GLA Whole Life-Cycle Carbon Assessment guidance document.

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.

Development Description

The proposals are for the Demolition of existing petrol filling station and associated convenience store (sui generis), and erection of a six-storey building comprising ground floor commercial space (Class E) and flexible commercial/educational space (Class E/F1), and 31 x residential apartments above.

WHOLE LIFE CARBON ASSESSMENTS

The London Plan Guidance (2022) for Whole Life Carbon states '*emissions are the total carbon emissions1 resulting from the construction and the use of a building over its entire life, including its demolition and disposal. They capture a building's operational carbon emissions from both regulated2 and unregulated3 energy use, as well as its embodied carbon emissions - that is, emissions associated with raw material extraction, the manufacture and transport of building materials, and construction; and the emissions associated with maintenance, repair and replacement, as well as dismantling, demolition and eventual material disposal.'*

With Carbon Emissions from operational building usage a subject to stricter regulations, it has for some time been the primary focus in built environment. However more recently, the focus has shifted to include emissions associated with the buildings materials themselves.

It has been stated in some studies that 10-20% of total carbon emissions historically is due to embodied carbon. With the reduction in carbon efficiency and operational emissions, this high percentage of embodied emission has been pushed further towards a point of necessity. Structural and material design choices have to become a greater asset to the built environment.

A Circular Economy

There is a growing industry belief that the way we design operate and build infrastructure needs a complete rethink to maximise efficiency and minimise waste. London Plan defines a circular economy as '...one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.' It is a move away from the current linear economic model, where materials are mined, manufactured, used and thrown away.

The three key principle issues facing the industry are pillars that a circular economy design and construction process must consider.

- Eliminate waste and pollution
- Keep materials in use
- Regenerate Nature

Based on the above, the London Plan created Policy SI 7, which further defines these issues as the six circular economy (CE) principles, in regard to building design process:

1. Building in layers – ensuring that different parts of the building are accessible and can be maintained and replaced where necessary.

2. Designing out waste – ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials.
3. Designing for longevity.
4. Designing for adaptability or flexibility.
5. Designing for disassembly.
6. Using systems, elements or materials that can be reused and recycled.

METHODOLOGY

Assessment Scope

The assessment of Whole Life Carbon (WLC) emissions consists of the following sections:

- Any carbon emissions associated with pre-construction demolition
- Any carbon savings associated with the retention, reuse and recycling of existing structures and materials that are already on-site
- Its operational carbon emissions (both regulated and unregulated)
- Its embodied carbon emissions
- Any future potential carbon savings post end-of-life, including savings from reuse and recycling of building structure and materials.

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 Emissions

To assess the embodied carbon for the project, a Life Cycle Assessment (LCA) tool – One Click LCA – 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)

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)'.

Data Sources

The following data sources were used in the LCA model:

- Database OneClick LCA material/component databases
- Drawings relevant plans, sections, elevations, and specifications from Architects and structural engineers

• Building Element Group	• Basis for Information
Demolition	Pre-demolition Audit undertaken by Sustainable Construction Services (See Appendix in P150051-RPT-8003)
Facilitating Works	Facilitating works have not been included within the calculation. To be updated at the next stage of design.
Substructure	The specific substructure quantities were determined information provided from the Revit model developed by the structural team. Refer to Appendix for the Structural Elements Volume table.
Superstructure	The specific superstructure quantities were determined information provided from the Revit model developed by the structural team. Refer to Appendix for the Structural Elements Volume table.
Finishes	Minimal information is available on the finishes. To be updated at the next stage of design.
Fittings, furnishings and Equipment (FF&E)	FF&E have not been included within the calculation. To be updated at the next stage of design.
Building Services/MEP	The primary pieces of technology required for energy generation have been included within the calculation. To be updated in further detail at the next stage of design.
Prefabricated buildings and building units	Not relevant for this development.
Work to existing buildings	Not relevant for this development.
External Works	Minimal information is available on the external works. To be updated at the next stage of design.

Life Cycle Modules Module	Description	Commentary of Data Source
A1 – A3 Construction Materials	Raw material supply (A1) includes emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed. Loss of raw material and energy are also taken into account. Transport impacts (A2) include exhaust emissions resulting from the transport of all raw materials from suppliers to the manufacturer's production plant as well as impacts of production of fuels. Production impacts (A3) cover the manufacturing of the production materials and fuels used by machines.	Calculated using EPDs which align the most applicable similar product.
A4 Transportation to Site	A4 includes exhaust emissions resulting from the transport of building products from manufacturer's production plant to building site as well as the environmental impacts of production of the used fuel.	Transport distances were estimated based on typical average transport distances based on material type & project location, provided by OneClick LCA.
A5 Construction / Installation Process	A5 covers the exhaust emissions resulting from using energy during the site operations, the environmental impacts of production processes of fuel and energy and water as well as handling of waste until the end-of waste state.	At this stage of design, the climate zone average construction impact was used and sized based upon the scale of the development.

B1 – B5 Maintenance and Material replacement	The environmental impacts of maintenance and material replacements (B1-B5) include environmental impacts from replacing building products after they reach the end of their service life. The emissions cover impacts from raw material supply, transportation and production of the replaced new material as well as the impacts from manufacturing the replaced material and handling of waste until the end-of-waste state.	Use (B1) include the impact of refrigerant leakage at leakage rate of 5% a year and 98% end of life recovery. Maintenance (B2) and Repair (B3) have not been considered due to accurate data being unavailable at this early stage. Replacement (B4) and Refurbishment (B5) account for the technical servicelife of the building components "BCIS Life expectancy of building components"
B6 Energy Use	The considered use phase energy consumption (B6) impacts include exhaust emissions from any building level energy production as well as the environmental impacts of production processes of fuel and externally produced energy. Energy transmission losses are also taken into account.	Operational Energy use figures are based on the GLA compliant Energy Assessment. Refer to P150051-RPT-8001 Energy Statement
B7 Water Use	The considered use phase water consumption (B7) impacts include the environmental impacts of production processes of fresh water and the impacts from wastewater treatment.	Water consumption based on Building Regulations Part G 'Enhanced Consumption' of 105l/pp/d and multiplied by the intended full occupancy of the development, using a combined EPD for freshwater and wastewater.

C1 – C4 End of Life		Emissions from deconstruction are calculated within the OneClick software based on the known parameters of the building and its location.

Limitations

The LCA has been completed using latest drawings only. There is no cost plan yet, therefore the information available is limited. As exact products or specifications have not been finalised, generic materials were specified, and default transport distances and service life of products were used in accordance with the RICS guidance where specific information is not currently known.

This use of generic information can be reviewed and the allowances in the design of the model can be refined as the detailed design develops.

RESULTS

These results should NOT be quoted as final. This is a Preliminary WLC assessment which will need to be updated at each stage of the design going forward.

Baseline Carbon Emissions

The following results summarise the embodied WLC emissions for the scheme. These results encompass the scope of inclusions and exclusions detailed within the document, and are derived using the full OneClick material component database.

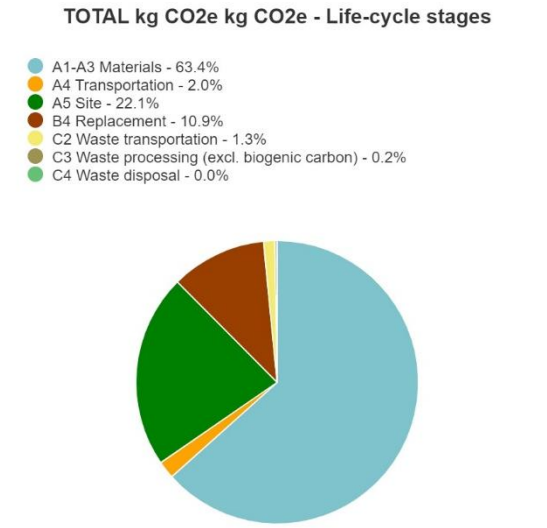
Modules	KgCOe	KgCO2/m2
A1 – A5	1987378.3	535.68
B1 – B6	443364.44	119.51
C1 – C4	50680.12	13.66
		668.85

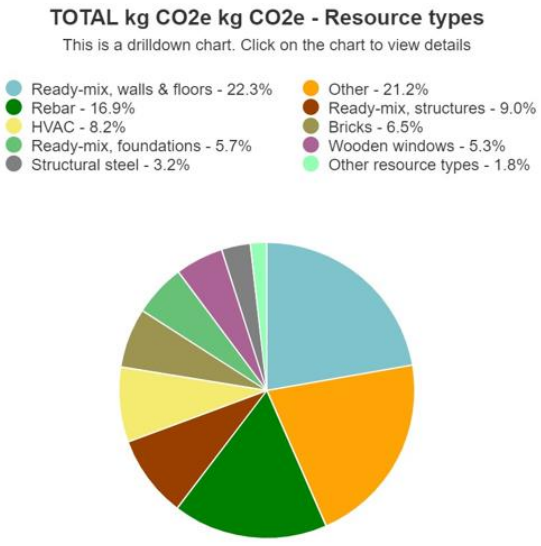
It should be noted that the figures presented above are well below benchmark figures and aspirational figures. This is because of the limited information available to date. With a significant amount of steel and concrete required for the cantilever structure it is anticipated that the overall Whole Life Carbon figure (kgCO2/m2) will be higher than benchmark data.

The figures presented in the table above are approximations only, based on the best available evidence at the time (end of stage 3). Calculations should be updated at the next stage of design and as more detailed information becomes available.

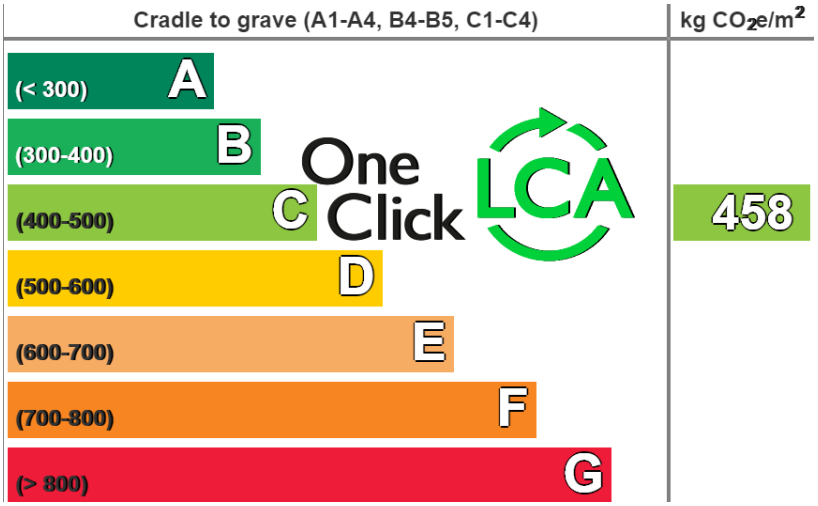
Opportunities to reduce embodied carbon through material replacement, optimisations in the design and the specification of materials with a percentage of recycled content have not been applied. These can be explored as the detailed design develops during RIBA Stage 4.

Carbon Emissions Breakdown





CONCLUSION



This LCA completed in RIBA Stage 3, should serve to inform the design team and the GLA on the benchmark WLC performance process for the proposed development. There remains considerable opportunity to enhance the WLC assessment and improve its accuracy, as the design develops.

The most intensive carbon emitters have been identified to highlight the products that have the most significant contribution to the overall emissions. Alongside the development of suggestions to reduce the carbon intensity of these products.

Next Steps

- More detail WLC analysis with more detailed design
- Explore options to reduce overall embodied carbon
- Explore the potential to procure materials from suppliers with EPDs.
- Compare against RIBA 2030 Climate Change benchmarks

APPENDIX

1. One Click Detailed Report
2. Structural Elements Volume Table

BP Finchley Road - Whole life carbon assessment, GLA / RICS

Project basic information

Result report: BP Finchley Road

Project	BP Finchley Road - BP Finchley Road
User	Fee Hags - 15.08.2022
Tool	Whole life carbon assessment, GLA / RICS
Details	This tool meets the RICS professional statement and guidance, whole life carbon assessment for the built environment 1st edition, November, 2017 and RIBA Embodied and whole life carbon assessment for architects.
General information	
Type	Apartment buildings
Country	United Kingdom
Address	104b Finchley Road
Gross Floor Area (m²)	3709
Number of above ground floors	5
Frame type	notDetermined
Certifications pursued	BREEAM UK New Construction 2018

Carbon Heroes Benchmark

Help

Embodied carbon benchmark

Cradle to grave (A1-A4, B4-B5, C1-C4)	kg CO_2e/m^2
(< 300) A	
(300-400) B	
(400-500) C	458
(500-600) D	
(600-700) E	
(700-800) F	
(> 800) G	

CH Q3 2021 UK - apartment

Results

Whole life carbon assessment, Greater London Authority

Download Results Summary

This is the project whole life carbon assessment according to RICS methodology, EN 15978 and Greater London Authority guidance for whole life-cycle carbon assessments. To see the detailed results report, please click More actions > Detailed report.

	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
0.1 Toxic Mat.													
0.2 Demolition													
0.3 Supports													
0.4 Groundworks													
0.5 Diversion													
1 Substructure	0	104 522	152	5 147			0						
2.1 Frame	0	0		0			0						
2.2 Upper Floors	0	151 887	218	7 906			0	6 288	0				
2.3 Roof	0	25 604	96	1 767			0	7 982	0				
2.4 Stairs & Ramps													
2.5 Ext. Walls	0	230 087	793	13 099			0	5	0				
2.6 Windows & Ext. Doors													

Help

2.7. Int. Walls & Partitions								
2.8 Int. Doors								
3 Finishes	0	1 745	8	176	0	8 781	0	
4 Fittings, furnishings & equipments								
5 Services (MEP)	0	26 224	64	0	0	52 689	0	−204 185
6 Prefabricated								
7 Existing bldg								
8 Ext. works	0	77	57	0	0			
Unclassified / Other	−17 220	847 005	42 610	456 179	0	163 435	0	
TOTAL kg CO2e kg CO_2e	−17 220	1 387 150	43 998	484 274	0	239 180	0	−204 185

Assessment of biogenic carbon and mass of materials

This table shows the impacts of construction materials for the biogenic carbon and mass categories

	A1-A3 Product Stage	B1 Use Phase	B4 Material replacement - materials	B5 Material refurbishment
Mass of raw materials kg	6 013 028		243 014	0
Biogenic carbon storage kg CO_2e bio	17 220			

Completeness (36%) and plausibility checker (grade: A)

Most contributing materials (TOTAL kg CO2e)

No.	Resource	Cradle to gate impacts (A1-A3)	Of cradle to gate (A1-A3)	Sustainable alternatives
1.	Reinforcement steel (rebar), generic	252 tons CO_2e	18.2 %	Show sustainable alternatives
2.	Ready-mix concrete	252 tons CO_2e	18.2 %	Show sustainable alternatives

Help

No.	Resource	Cradle to gate impacts (A1-A3)	Of cradle to gate (A1-A3)	Sustainable alternatives
3.	Ready-mix concrete	159 tons CO_2e	11.4 %	Show sustainable alternatives
4.	Clay brick, one brick, 215 x 65 x 102.5mm	122 tons CO_2e	8.8 %	Show sustainable alternatives
5.	Ready-mix concrete, normal strength, generic	84 tons CO_2e	6.1 %	Show sustainable alternatives
6.	Ready-mix concrete	77 tons CO_2e	5.5 %	Show sustainable alternatives
7.	Structural steel sections and plates	58 tons CO_2e	4.2 %	Show sustainable alternatives
8.	Air handling unit, with heat recovery through plate heat exchanger	54 tons CO_2e	3.9 %	Show sustainable alternatives
9.	Triple glazing windows with wooden frame	51 tons CO_2e	3.7 %	Show sustainable alternatives
10.	Reinforcement steel (rebar), generic	49 tons CO_2e	3.6 %	Show sustainable alternatives
11.	Ready-mix concrete, normal-strength, generic	44 tons CO_2e	3.2 %	Show sustainable alternatives
12.	Internal wall system with glass wool core, gypsum board and steel frame	35 tons CO_2e	2.5 %	Show sustainable alternatives
13.	Steel framing system for dry lining	33 tons CO_2e	2.4 %	Show sustainable alternatives
14.	Anodised aluminium coil and sheet, for wall cladding	26 tons CO_2e	1.9 %	Show sustainable alternatives
15.	Ready-mix concrete, normal strength, generic	19 tons CO_2e	1.4 %	Show sustainable alternatives
16.	Solar panel photovoltaic system, EU average	14 tons CO_2e	1.0 %	Show sustainable alternatives
17.	Reinforcement steel (rebar), generic	13 tons CO_2e	0.9 %	Show sustainable alternatives
18.	Air/air heat pump for commercial buildings	12 tons CO_2e	0.9 %	Show sustainable alternatives
19.	Ready-mix concrete, reinforcement included in stage A5, for ground slabs	11 tons CO_2e	0.8 %	Show sustainable alternatives

Help

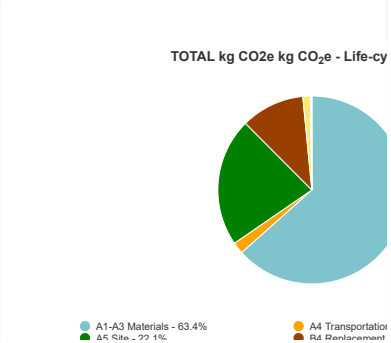
No.	Resource	Cradle to gate impacts (A1-A3)	Of cradle to gate (A1-A3)	Sustainable alternatives
20.	Glass wool insulation panels, unfaced, generic	3,8 tons CO_2e	0.3 %	Show sustainable alternatives
21.	Waterproofing membrane	4,1 tons CO_2e	0.3 %	Show sustainable alternatives
22.	Glass wool insulation	2,5 tons CO_2e	0.2 %	Show sustainable alternatives
23.	Polycarbonate domed rooflight (skylight)	3,1 tons CO_2e	0.2 %	Show sustainable alternatives
24.	Plastic vapour control layer	1,7 tons CO_2e	0.1 %	Show sustainable alternatives
25.	Polypropylene vapour membrane, French average	0,8 tons CO_2e	0.1 %	Show sustainable alternatives

Graphs

Overview | Bubble | Life-cycle stages | Classifications | All graphs

Life-cycle overview of TOTAL kg CO2e

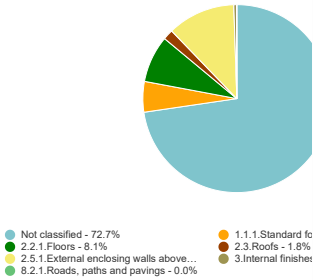
Pie | Bar | Column | Treemap



Help

C2 Waste transportation - 1.3%
C3 Waste proces
C4 Waste disposal - 0.0%

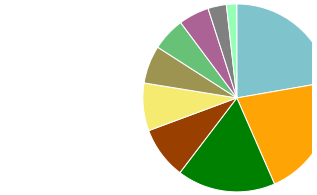
TOTAL kg CO2e kg CO_2e - Class



Not classified - 72.7%
1.1.1.Standard fo
2.2.1.Floors - 8.1%
2.3.Roofs - 1.8%
2.5.1.External enclosing walls above...
3.Internal finishes
8.2.1.Roads, paths and pavings - 0.0%

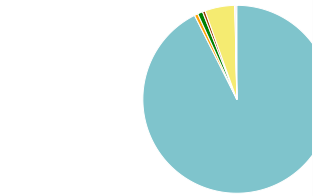
TOTAL kg CO2e kg CO_2e - Resou

This is a drilldown chart. Click on the chart to



Ready-mix, walls & floors - 22.3%
Other - 21.2%
Rebar - 16.9%
Ready-mix, struc
HVAC - 8.2%
Bricks - 6.5%
Ready-mix, foundations - 5.7%
Wooden windows
Structural steel - 3.2%
Other resource ty

Mass kg - Classification



Not classified - 92.6%
1.1.1.Standard fo
2.2.1.Floors - 0.9%
2.3.Roofs - 0.5%
2.5.1.External enclosing walls above...
3.Internal finishes
5.Services - 0.1%
8.2.1.Roads, path

Help

Show data table: ☐TOTAL kg CO2e kg CO_2e - Life-cycle stages ☐TOTAL kg CO2e kg CO_2e - Classifications ☐TOTAL kg CO2e kg CO_2e - Resource types ☐Mass kg - Classifications

TOTAL kg CO2e kg CO_2e - Life-cycle stages

Item	Value	Unit	Percentage %
A1-A3 Materials	1 400 000	kg CO_2e	69.92 %
A4 Transportation	44 000	kg CO_2e	2.22 %
A5 Site	480 000	kg CO_2e	24.41 %
B4 Replacement	240 000	kg CO_2e	12.06 %
B6a Regulated Energy	−200 000	kg CO_2e	-10.29 %
C2 Waste transportation	28 000	kg CO_2e	1.41 %
C3 Waste processing (excl. biogenic carbon)	5 500	kg CO_2e	0.28 %
C4 Waste disposal	31	kg CO_2e	0.0 %

TOTAL kg CO2e kg CO_2e - Classifications

Item	Value	Unit	Percentage %
Not classified	1 500 000	kg CO_2e	77.26 %
1.1.1.Standard foundations	110 000	kg CO_2e	5.61 %
2.2.1.Floors	170 000	kg CO_2e	8.6 %
2.3.Roofs	37 000	kg CO_2e	1.87 %
2.5.1.External enclosing walls above ground level	250 000	kg CO_2e	12.43 %
3.Internal finishes	11 000	kg CO_2e	0.54 %
5.Services	−130 000	kg CO_2e	-6.31 %
8.2.1.Roads, paths and pavings	130	kg CO_2e	0.01 %

TOTAL kg CO2e kg CO_2e - Resource types

Item	Value	Unit	Percentage %

Help

Ready-mix, walls & floors	440 000	kg CO_2e	22.26 %
Other	420 000	kg CO_2e	21.17 %
Rebar	340 000	kg CO_2e	16.93 %
Ready-mix, structures	180 000	kg CO_2e	8.99 %
HVAC	160 000	kg CO_2e	8.21 %
Bricks	130 000	kg CO_2e	6.51 %
Ready-mix, foundations	110 000	kg CO_2e	5.73 %
Wooden windows	100 000	kg CO_2e	5.25 %
Structural steel	63 000	kg CO_2e	3.16 %
Other resource types	35 000	kg CO_2e	1.78 %

Mass kg - Classifications

Item	Value	Unit	Percentage %
Not classified	5 600 000	kg	92.58 %
1.1.1.Standard foundations	36 000	kg	0.59 %
2.2.1.Floors	53 000	kg	0.88 %
2.3.Roofs	28 000	kg	0.47 %
2.5.1.External enclosing walls above ground level	310 000	kg	5.13 %
3.Internal finishes	3 800	kg	0.06 %
5.Services	4 000	kg	0.07 %
8.2.1.Roads, paths and pavings	13 000	kg	0.22 %

Data sources

Sources

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country

Help

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country
Acrylic water-based flame retardant top coat with eggshell finish	1180-1380 kg/m3, 10 m2/l	Johnstone's Performance Coatings Flame Retardant Acrylic Eggshell Brilliant White, Base L, Base Z, Magnolia	PPG Architectural Coatings UK Ltd.	BRE	BREG EN EPD000353	EPD Johnstone's Trade Flame Retardant Acrylic Eggshell	EN15804+A1	Third-party verified (as per ISO 14025)	2021	unitedKingdom
Aggregate, from marine sediments	Concrete sand, Sandbox sand, Washed sand, Pebbles, Concrete gravel, Filler sand	Betonsand 0/4 kl.P/E, Betonsand kl. E Metro, Sandkassesand, Vasket sand 0/2, Nøddesten 16/25 kl. P, Betongrus 0/8, Fillersand/DrySand	NCC	International EPD System	S-P-02081	EPD for aggregates from Copenhagen, terminal for marine aggregates – Avedøre	EN15804+A1	Third-party verified (as per ISO 14025)	2020	denmark
Air handling unit, with heat recovery through plate heat exchanger	1000 m3/h (588.6 ft3/min), 214 kg/unit (472 lbs/unit)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2019	LOCAL
Air/air heat pump for commercial buildings	99.1 kg/unit, P=10.8 kW	DONNEE PAR DEFAUT	DED	INIES	INIES_DPAC20210716_163240, 28828	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2022	france
Anodised aluminium coil and sheet, for wall cladding	2 mm, anodic layer: 10 µm	55HX®	Aleris	European Aluminium	EPD1–Aleris-2017	EPD ANODISED ALUMINIUM COIL AND SHEET	EN15804+A1	Third-party verified (as per ISO 14025)	2017	belgium
Bituminous waterproofing system - Single layer	5.44 kg/m2	AXTER, DERBIGUM, MEPLE, SIPLAST-ICOPAL, SOPREMA	Chambre Syndicale Française de l'Etanchéité	INIES	INIES_CTOI20180219_105730, 8349	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2017	france

Help

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country
Ceramic floor tile	10 mm, average density 2000 kg/m3		Mosa	MRPI	11.1.0001.004	EPD Vloertegelcollectie Koninklijke Mosa	EN15804+A1	Third-party verified (as per ISO 14025)	2013	unitedKingdom
Clay brick, one brick, 215 x 65 x 102.5mm				ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom
Concrete cast-in-situ roof slab incorporating beams, 300mm depth	C 30/37, U-value 0.13 W/m2K			One Click LCA		One Click LCA generic construction definitions				europe
Drainage floor underlay from EPS	ép.25 mm	DONNEE PAR DEFAUT	DED	INIES	INIES_DCOU20191220_144652, 13812	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2019	france
Geotextile from polypropylene	300 g/m2		MDEGD	INIES	INIES_DGÉO20180223_161025, 7993	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2018	france
Glass wool insulation	R=5.0 m2K/W, L=0.040 W/mK, ép. 200 mm, 2.295 kg/m2, Lambda=0.04 W/(m.K)	ISOLANT TOITURE 200	ISOVER	INIES	INIES_IISO20170504_091653, 12203	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2017	france

Help

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country
Glass wool insulation panels, unfaced, generic	L = 0.031 W/mK, R = 3.23 m2K/W (18 ft2°Fh/BTU), 25 kg/m3 (1.56 lbs/ft3), (applicable for densities: 0-25 kg/m3 (0-1.56 lbs/ft3)), Lambda=0.031 W/(m.K)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL
Green roof assembly	R > 5m2.K/W			-		One Click LCA generic construction definitions				europe
Internal wall system with glass wool core, gypsum board and steel frame	56.49 kg/m2			INSIDE/INSIDE	NIBE3349	EPD 21002-NIBE3349 - Systeemwand met driedubbele rogipsplaat en glaswol	EN15804+A1	Third-party verified (as per ISO 14025)	2020	netherlands
Plastic vapour control layer	0.2 mm		Tommen Gram	EPD Norge	NEPD-341-230-NO	Gram Dampsperre, Tommen Gram Folie AS (2015)	EN15804+A1	Third-party verified (as per ISO 14025)	2015	norway
Polycarbonate domed rooflight (skylight)	U = 1.8 W/m2K, 17.55 kg/m2	Mardome Trade Dome Rooflight	Brett Martin Daylight Systems	BRE	BREG EN EPD 000358	EPD Mardome Trade Triple skin polycarbonate rooflight on 15mm PVC Kerb	EN15804+A1	Third-party verified (as per ISO 14025)	2021	unitedKingdom
Polyethylene sealing film for slabs	ép. 150 micron	Donnee par default	MDEGD	INIES	INIES_DFIL20180427_114145, 8228	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2018	france

Help

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country
Polypropylene vapour membrane, French average	0.18 kg/m2		MDEGD	INIES	INIES_DPAR20180223_160939, 7991	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2018	france
Precast concrete paving (Blocks, Slabs, Channels and Kerbs)				ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom
Ready-mix concrete	RC 40/50 (40/50 MPa), 25% Cement replacement with blast furnace slag (GGBS)			ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom
Ready-mix concrete	RC 32/40 (32/40 MPa), 30% Cement replacement with fly ash			ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom
Ready-mix concrete	RC 32/40 (32/40 MPa), with CEM I			ICE	-	ICE database August 2019, V3.0	EN15804+A1	Self declared	2019	unitedKingdom
Ready-mix concrete, normal strength, generic	C25/30 (3600/4400 PSI) with CEM II/B-V, 30% fly ash content (280 kg/m3; 17.5 lbs/ft3 total cement)			One Click LCA	-	One Click LCA	EN15804+A1, EN15804+A2	Internally verified	2020	LOCAL
Ready-mix concrete, normal strength, generic	C28/35 (4000/5000 PSI) with CEM II/B-V, 30% fly ash content (300 kg/m3; 18.7 lbs/ft3 total cement)			One Click LCA	-	One Click LCA	EN15804+A1, EN15804+A2	Internally verified	2020	LOCAL

Help

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country
Ready-mix concrete, normal-strength, generic	C30/37 (4400/5400 PSI), 10% (typical) recycled binders in cement (300 kg/m3 / 18.72 lbs/ft3)			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL
Ready-mix concrete, reinforcement included in stage A5, for ground slabs	C25/30 XC1/XC2 CEM II/A, 2387.04kg/m3		SNBPE	INIES	INIES_CBÉT20190724_131702, 22908	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2019	france
Reinforcement steel (rebar), generic	0% recycled content (only virgin materials), A615			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL
Reinforcement steel (rebar), generic	0% recycled content		One Click LCA 2022	One Click LCA	-	One Click LCA	EN15804+A1, EN15804+A2	Internally verified	2022	LOCAL
Reinforcement steel (rebar), generic	90% recycled content, A615			One Click LCA	-	One Click LCA	EN15804+A1	Internally verified	2018	LOCAL
Soil substrates for green roofs			MDEGD	INIES	INIES_DSUB20180223_161051, 7994	MDEGD_FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2018	france
Solar panel photovoltaic system, EU average				One Click LCA	-	One Click LCA	ISO14040	Internally verified	2015	LOCAL
Steel column, UC 356x368x129	S355, for Germany			-		One Click LCA generic construction definitions				germany

Help

Resource name	Technical specification	Product	Manufacturer	EPD program	EPD number	Environment Data Source	Standard	Verification	Year	Country
Steel framing system for dry lining	0.4 -1.5 mm, 7850 kg/m3		Voestalpine Metsec plc	EPD Hub	EPDHUB-0018	EPD Steel Framing System for Dry Lining voestalpine Metsec plc	EN15804+A1, EN15804+A2	Third-party verified (as per ISO 14025)	2022	OCLEPD, unitedKingdom
Structural steel sections and plates	S235-S960		bauforumstahl	IBU	EPD-BFS-20180116-IBG2-EN	EPD Structural Steel: Sections and Plates bauforumstahl e.V.	EN15804+A1	Third-party verified (as per ISO 14025)	2018	europe
Triple glazing windows with wooden frame	42.6 kg/m2, 1.2 W/m2K, biogenic CO2 not subtracted (for CML)	FDES collective utilisable par toute entreprise qui produit en France des fenêtres et portes fenêtres triple vitrage en bois tropicaux.	INSTITUT TECHNOLOGIQUE FCBA	INIES	INIES_CFEN20200421_100619, 16413	FDES	EN15804+A1	Third-party verified (as per ISO 14025)	2020	france
Waterproofing membrane	1.8 mm, 2090 g/m2	BlueProof	Protan	EPD Norge	NEPD-1792-757-EN	EPD Protan BP (BlueProof roofing membrane) Protan AS	EN15804+A1	Internally verified	2019	norway

Parmarbrook - RC Volume Schedule Foundations			
Category	Type	Material: Name	Material: Volume
Structural Foundations	1000mm THICK RAFT SLAB	PB-Concrete (New)	481.34841 m³
1000mm THICK RAFT SLAB: 1			481.34841 m³
Structural Foundations: 1			481.34841 m³
Grand total: 1			481.34841 m³

Parmarbrook - RC Volume Schedule Slabs			
Category	Type	Material: Name	Material: Volume
Floors	225 THICK BEAM & BLOCK	PB-Concrete (New)	42.17429 m³
225 THICK BEAM & BLOCK: 1			42.17429 m³
Floors	250 thk precast 100 thk topping	PB-Concrete (New)	13.34594 m³
250 thk precast 100 thk topping: 1			13.34594 m³
Floors	250mm THICK R.C. SLAB	PB-Concrete (New)	5.26896 m³
250mm THICK R.C. SLAB: 3			5.26896 m³
Floors	300 THICK COMPOSITE DECK	PB-Concrete (New)	194.97975 m³
300 THICK COMPOSITE DECK: 1			194.97975 m³
Floors: 6			255.76895 m³
Grand total: 6			255.76895 m³

Parmarbrook - RC Volume Schedule Walls			
Category	Type	Material: Name	Material: Volume
Walls	200mm THICK R.C. WALL	PB-Concrete (New)	19.78281 m³
200mm THICK R.C. WALL: 5			19.78281 m³
Walls	300mm THICK R.C. WALL	PB-Concrete (New)	90.57374 m³
300mm THICK R.C. WALL: 8			90.57374 m³
Walls	TUBE WALL		479.46809 m³
TUBE WALL: 100			479.46809 m³
Walls: 113			589.82464 m³
Grand total: 113			589.82464 m³

Parmarbrook - RC Volume Schedule Piles			
Category	Type	Material: Name	Material: Volume
Structural Foundations	PB_FOU_C-Pile-Circular	PB-Concrete Pile	478.57802 m³
PB_FOU_C-Pile-Circular: 85			478.57802 m³
Structural Foundations: 85			478.57802 m³
Grand total: 85			478.57802 m³

Parmarbrook - Steel Volume Schedule - Columns			
Category	Type	Material: Name	Material: Volume
Structural Columns	SHS 200x200x5 HANGER ABOVE	PB-Steel (New)	0.13127 m³
SHS 200x200x5 HANGER ABOVE: 7			0.13127 m³
Structural Columns	UKC356x368x129	PB-Steel (New)	1.19130 m³
UKC356x368x129: 18			1.19130 m³
Structural Columns: 25			1.32257 m³
Grand total: 25			1.32257 m³

Parmarbrook - Steel Weight Schedule - Framing			
Category	Type	Material: Name	Material: Volume
Structural Framing	CHS193.7x6.3	PB-Steel (New)	0.07111 m³
CHS193.7x6.3: 6			0.07111 m³
Structural Framing	CHS193.7x8	PB-Steel (New)	0.02404 m³
CHS193.7x8: 2			0.02404 m³
Structural Framing	CHS406.4x16	PB-Steel (New)	1.19267 m³
CHS406.4x16: 12			1.19267 m³
Structural Framing	UKB254x146x43	PB-Steel (New)	0.76143 m³
UKB254x146x43: 27			0.76143 m³
Structural Framing	UKB356x171x45	PB-Steel (New)	1.72337 m³
UKB356x171x45: 61			1.72337 m³
Structural Framing	UKB406x178x54	PB-Steel (New)	0.13096 m³
UKB406x178x54: 6			0.13096 m³
Structural Framing	UKB610x229x113	PB-Steel (New)	1.56335 m³
UKB610x229x113: 6			1.56335 m³
Structural Framing	UKB686x254x125	PB-Steel (New)	0.08725 m³
UKB686x254x125: 1			0.08725 m³
Structural Framing	UKB838x292x226	PB-Steel (New)	0.48550 m³
UKB838x292x226: 2			0.48550 m³
Structural Framing	UKB914x419x388	PB-Steel (New)	0.58521 m³
UKB914x419x388: 1			0.58521 m³
Structural Framing	UKC254x254x73	PB-Steel (New)	0.88265 m³
UKC254x254x73: 7			0.88265 m³
Structural Framing: 131			7.50754 m³
Grand total: 131			7.50754 m³

PARMAR BROOK

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GENERAL NOTES:

1. This drawing is copyright © and the property of Parmarbrook. It shall not to be copied in whole or in part, except under a written agreement.
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4. This drawing is to be read in conjunction with all relevant Architect's and Services Engineer's drawings and specifications.
5. The contractor is to notify the contract administrator (c.a) of any discrepancies between this drawing and site conditions before implementing the work.
6. Details on this drawing are to be checked on site by the contractor and any discrepancies reported to the engineer so that adjustment can be made as necessary.
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9. All work by the contractor must be carried out in such a way to satisfy all the requirements under the Health and Safety at work act.
10. All work will be carried out in compliance with the requirements of the relevant statutory authorities and regulations.
11. All structural openings setting out to be confirmed in all architects and specialists drawings. Any discrepances to be communicated to all parts, including Parmarbrook.

Rev:	Date:	Description:	By:

Project:
104a FINCHLEY ROAD

Title:
STRUCTURAL ELEMENT VOLUMES TABLES

Client:
TREVELLYAN DEVELOPMENTS LTD

Architect:
TP BENNETT

Status:
STAGE 2

Designed:	Drawn:
MG	JB
Checked:	Date:
MG	AUG 2022
Project No:	Scale @ A1:
2562	

Drawing No: 2562-PAR-XX-ZZ-SH-S-0001
Suitability: Rev:

04/08/2022 143550