

This City

Postal Street, Manchester

Stage 2 Embodied Carbon Assessment

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Executive Summary

Hannan Associates have been appointed to undertake an Embodied Carbon Assessment at RIBA Stage 2 of the proposed Postal Street development, located in Manchester City Centre. The Greater Manchester Combined Authority and Manchester City Council require that new developments consider whole life cycle emissions where possible.

This assessment estimates the whole life embodied carbon of the proposed development, based on the Stage 2 Cost Plan produced by AtkinsRéalis 'MCC Postal Street - RIBA Stage 2 Addendum Cost Plan Rev 3.0 DRAFT 041024', and other supporting information from the design team.

Whole life carbon can be categorised into two distinct and specific aspects: operational carbon which describes the carbon emissions associated with the in-use operation of the building; and embodied carbon, which describes the 'upfront' emissions associated with the construction of the building, as well as 'in-use' maintenance and repair of materials and disposal at the 'end-of-life' stage. This report assesses the embodied carbon of the proposed development over a 60-year study period to compare results with the LETI best practice upfront embodied carbon design targets and considers the limits set by the recently launched UKNZCBS Pilot Version, published in September 2024.

This assessment considers the current referenced design of Postal Street and does not include works to any other aspects of the development unless specifically listed in the Life Cycle Assessment scope provided in Appendix A.

This embodied carbon analysis has been conducted in accordance with the process outlined in the London Energy Transformation Initiative (LETI) Embodied Carbon Primer published 2020, and as required in accordance Policy JP-S2: Carbon and Energy of the Greater Manchester Combined Authority Places for Everyone Joint Development Plan.

1.0 Introduction

Hannan Associates has been requested to undertake an Embodied Carbon Assessment in support of the planning application for the Postal Street residential development located in the Northern Quarter of Manchester City Centre. The following assessment estimates the whole life embodied carbon of the proposed development, based on Stage 2 materials measurements and specifications provided by the design team and following the RICS Whole Life Carbon Assessment for the Built Environment 1st Edition guidance (2017).

This assessment has been prepared on behalf of MCC This City to support the Postal Street planning application submission in accordance with the requirements of the Greater Manchester Combined Authority Places for Everyone Joint Development Plan (PfE), adopted March 2024.

1.1 Project Overview

The development comprises the erection of a residential apartment building (Use Class C3a), of eight storeys (126 apartments); together with ground floor commercial units (Use Class E), cycle parking provision, and other associated works. The proposed development comprises 126 new residential units and 711sqm of commercial ground floor space as shown in the architectural drawings below.



Proposed Building Elevations



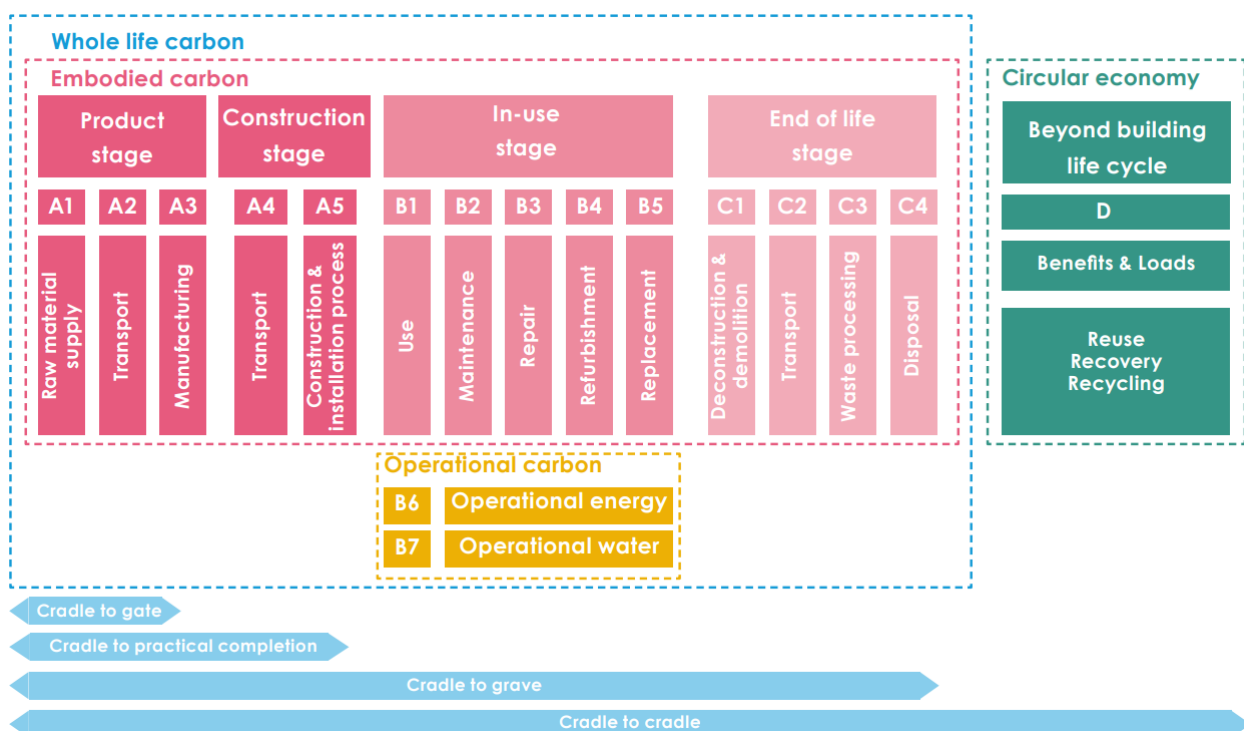
Proposed Ground Floor and Typical Upper Floor Plan

1.2 Embodied Carbon Assessment Requirements

In accordance with Policy JP-S2: Carbon and Energy of the PfE, all new developments are required to support Greater Manchester's ambition to become a carbon neutral city-region by no later than 2038, by delivering a dramatic reduction in greenhouse gas emissions and promoting the use of carbon assessment tools to ensure the long-term impacts of development can be captured. Section f. of Policy JP-S2 also requires that all new developments consider whole life cycle emissions where possible.

Whole life carbon can be categorised into two distinct and specific aspects: operational carbon and embodied carbon. Operational carbon describes the emissions associated with the 'in-use' operation of the building and the energy consumed by building systems, including heating, hot water, cooling, ventilation, and lighting systems, as well as unregulated energy use and equipment such as fridges, washing machines, TVs and cooking.

The focus of this assessment is on embodied carbon, which refers to the emissions associated with the energy consumption and chemical processes that occur during the extraction, manufacture, transportation, assembly, replacement and deconstruction of materials or products used throughout the building's lifetime. Embodied carbon can be further broken down into 'upfront', 'in-use' and 'end-of-life' emissions, which consider separately the building's construction and production of materials; in-use maintenance, repair or replacement of materials; and the eventual deconstruction and disposal of building materials, comprising modules A1-C4 as demonstrated in the diagram below.



The lifecycle stages included in an embodied carbon assessment that considers Modules A1- C4 can be defined as follows:

- **Product Stage** (A1-A3) - These modules consider the carbon emissions released during extraction, processing, manufacture (including prefabrication of components or elements) and transportation of materials between these processes, until the product leaves the factory gates to be taken to site. Note that recycled content of a product affects the kgCO₂e released in modules A1-A3.
- **Construction Stage** (A4-A5) - These modules include the carbon emissions released during transportation of materials/products to site, energy usage due to activities on site (site huts, machinery use etc) and the carbon associated with the production, transportation, and end-of-life processing of materials used on site.
- **In-Use Stage** (B1-B7) These modules consider the carbon emissions released due to use, maintenance, repair, replacement, refurbishment and operational energy and water while the building is in use. Module B4 (replacement) is often the focus of the use stage when embodied carbon is being considered. Note that modules B6 and B7 are not considered within an embodied carbon assessment.
- **End-of-Life** (C1-C4) These modules consider the carbon released during decommissioning, stripping out, demolition, deconstruction, transportation of materials away from the site, waste processing and the disposal of materials.

The reduction of operational carbon (modules B6 and B7) has been assessed in the Environmental Standards and Energy Statement submitted alongside the planning application for the proposed development, which demonstrates how significant operational carbon savings have been achieved compared to that of the notional building. This assessment will, therefore, consider the A1 to C4 life cycle stages of the building only, in accordance with the LETI methodology for an embodied carbon assessment, over a 60-year study period.

1.3 Scope of Analysis

As previously stated, modules A1 to C4 will be included within the system boundary of this assessment. The scope of building elements considered within this assessment is consistent with the LETI methodology for an embodied carbon assessment and BREEAM Mat 01 guidance for defining the In-Scope and Out-of-Scope building elements based upon the RICS New Rules of Measurement (NRM) classification system. This ensures that the value for upfront embodied carbon is comparable to the best practice design targets set within the LETI Climate Emergency Design Guide, published 2020.

As such, this assessment considers building substructure, superstructure, MEP, façade and external works in accordance with the following scope:

Table 1 In-scope building materials.

Level 1 Group Element	Level 2 Element	Level 3 Sub Element
1. Substructure	1. Substructure	1. Standard foundations
		2. Specialist foundation systems
		3. Lowest floor construction
		4. Basement excavation
		5. Basement retaining walls
2. Superstructure	1. Superstructure	1. Steel frames
		2. Space decks
		3. Concrete casings to steel frame
		4. Concrete frames
		5. Timber frames
		6. Other frames
	2. Upper Floors	1. Floors
	3. Roof Coverings	1. Roof structure
		2. Roof coverings
		3. Specialist roof systems
		4. Roof lights, skylights and openings

	4. Stairs and Ramps	1. Stairs and ramp structures
	5. External Walls	1. External enclosing walls above ground floor level
		2. External enclosing walls below ground level
		3. Solar or rain screening
	6. Windows and External Doors	1. External windows
	7. Internal Wall and Partitions	1. Walls and partitions (education only)
5. Services	5. Heat Source	1. Heat source
	6. Space Heating and Air Conditioning	1. Central heating
		2. Local heating
		3. Central cooling
		4. Local cooling
		5. Central heating and cooling
		6. Local heating and cooling
		7. Central air-conditioning
		8. Local air-conditioning
	7. Ventilation	1. Central ventilation
		2. Local ventilation
		3. Smoke extract control
	9. Fuel Installations and Systems	1. Fuel storage
		2. Fuel distribution systems
		3. Smoke extract or control
8. External works	2. Roads, paths and paving	1. Roads, paths and paving
		2. Special surfacing and paving

2.0 Methodology

This embodied carbon assessment has been undertaken using the One Click LCA RICS Whole life carbon assessment for the built environment 1st edition tool and utilises Stage 2 materials measurements and specifications provided by the design team to assess the whole life embodied carbon of the proposed development and compare its performance to best practice targets.

Due to the early stage of design, the dataset and quantities used are primarily taken from the Stage 2 cost plan provided by AtkinsRéalis and other drawings which reflect the level of design detail at Stage 2. In addition, as expected at Stage 2, the structural, architectural and MEP reports only infer on materiality and system types and provide limited detail on exact product specifications. As such, carbon emissions factors or Environmental Product Declarations (EPDs) applied to material types and quantities are generally regionalised and generic datasets. An EPD is an independently verified and registered document that communicates the environmental performance or impact of a product or material over its lifetime.

Embodied carbon assessments are an iterative process through which the detail and accuracy of results improve during design development as materials and product specifications are refined. Consequently, the results of this assessment provide a high-level indication of the developments' embodied carbon only, with a suitable level of detail to demonstrate how embodied carbon has been considered in accordance with Policy JP-S2 of the PfE.

3.0 Industry Carbon Benchmarks

Postal Street has been designed to consider the LETI Climate Emergency Design Guide target metrics for domestic/residential buildings, published in 2020, to demonstrate the commitment to best practice low carbon design. The performance targets represent the best practice for how buildings should be designed to align with the challenging trajectory required to have a realistic prospect of achieving net zero carbon for the whole UK building stock by 2050.

The London Energy Transformation Initiative (LETI) was established in 2017 to support the transition of the capital's built environment to net zero carbon, providing guidance that can be applied to the rest of the UK. The LETI targets for upfront embodied carbon are used within guidance provided by the UK Green Building Council (UKGBC) as the embodied carbon performance targets for new-build homes and provide a trajectory for what will need to be achieved on the pathway to net zero carbon.

There are several other industry standards for embodied carbon, including the recently launched UK Net Zero Carbon Building Standard (UKNZCBS), published September 2024, and the RIBA 2030 Climate Challenge. The Pilot Version of the UKNZCBS also sets limits for upfront carbon for new developments that vary based on the year a project commences on site. The RIBA 2030 Climate Challenge sets limits for a building's life cycle embodied carbon, which considers modules A1-A5, B1-B5, C1-C4. These limits consider a wider scope of building materials than the LETI targets, and embodied carbon results must be calculated using the methodology within the RICS Professional Standard to be directly comparable.

For this report, the targets set by the LETI, now known as the Low Energy Transformation Initiative, have been used as they most closely align with the scope of assessment and reflect the importance of considering embodied carbon at the early design stage.

The UKNZCBS and RIBA limits are shown in the table below for information, with the higher limits reflecting the greater scope of building materials included within the assessment, such as internal finishes and FF&E.

Table 2 LETI, RIBA and UKNZCBS Embodied Carbon Targets.

	LETI Climate Emergency Design Guide			RIBA Climate Challenge			UKNZCBS		
	Baseline	Best Practice 2020	Best Practice 2030	Business as Usual	2025 Target	2030 Target	2025	2026	2027
							Limits refer to date of commencement on site.		
Life Cycle Modules	A1-A5			A1-A5, B1-B5, C1-C4			A1-A5		
Embodied Carbon (kgCO ₂ e/m ²)	800	<500	<300	1200	<800	<625	565	525	490

*UKNZCBS and LETI targets consider a building's upfront embodied carbon only (modules A1-A5) and cannot be directly compared with each other, or to the RIBA targets, which consider life cycle embodied carbon (modules A1-A5, B1-B5, C1-C4 including sequestration).

4.0 Results

The results of the embodied carbon assessment are summarised in the table below:

Table 1 Results of embodied carbon assessment.

Life Cycle Stages	tCO ₂ e	kgCO ₂ e/m ² (GI A)	LETI Best Practice 2020	Achieved
Upfront Carbon (A1-A5)	4787	483	<500	YES
In-Use (B2-B5)	1537	155		
End-of-life (C1-C4)	983	90		
Total	7217	728		
Total (including timber sequestration)	6629	669		

- The upfront carbon modules (A1-A5) result in 483 kgCO₂/m².
- Embodied in-use and end-of-life Stages B and C, respectively are estimated to produce 245 kgCO₂/m².
- The whole life embodied carbon for Postal Street is 728 kgCO₂/m² (modules A-C, excluding B6 & B7, excluding sequestered carbon).

Whilst the LETI Climate Emergency Design Guide only sets limits for a building's upfront embodied carbon and therefore the in-use and end-of-life carbon results cannot be compared to an industry benchmark, it is still considered good practice to report all results.

Sequestered carbon refers to the biogenic carbon stored in timber and timber-based products used in the building and during its construction. It is considered that this carbon is extracted from the atmosphere during the growth of the biomass; stored during the lifetime of the building and released back into the atmosphere at its end-of-life, when it is incinerated or decays naturally, equating to a carbon balance of 'zero' over its lifetime. As timber can be a carbon negative material, its use is to be encouraged wherever possible, provided it is harvested from sustainably responsibly managed woodlands. In accordance with the LETI methodology for an embodied carbon assessment, sequestered carbon has been excluded from the reported embodied carbon value and reported separately.

The results of the embodied carbon assessment are broken down further in the following figures which depict the findings firstly by life cycle stage and then by building element.

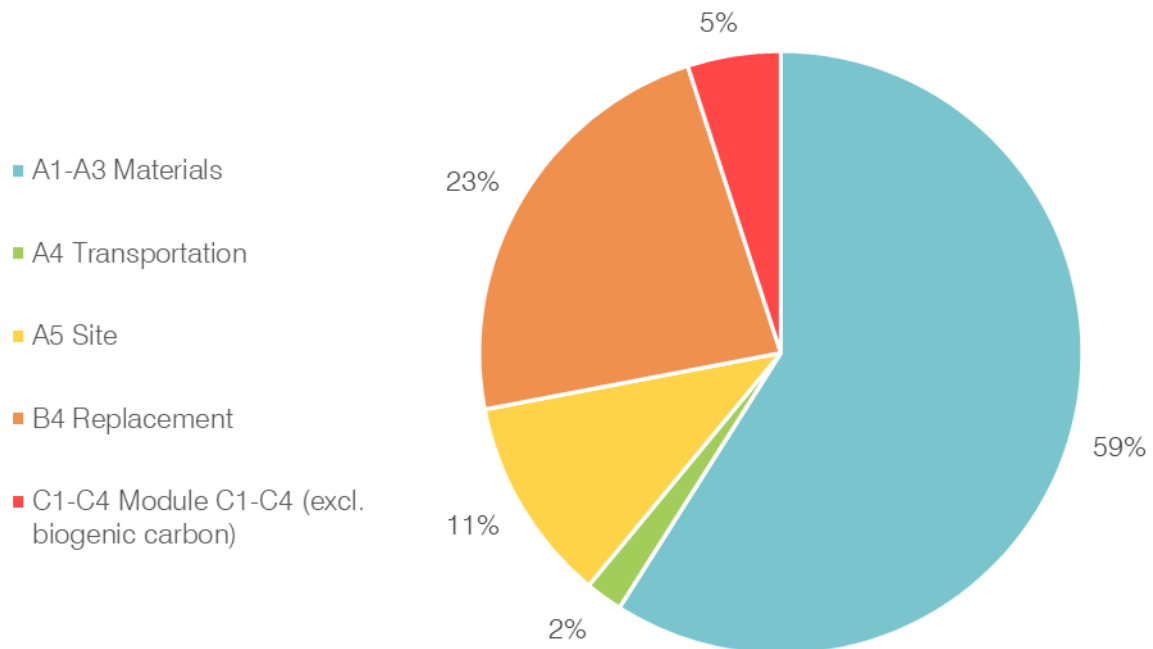


Figure 1 Embodied carbon by life cycle stages.

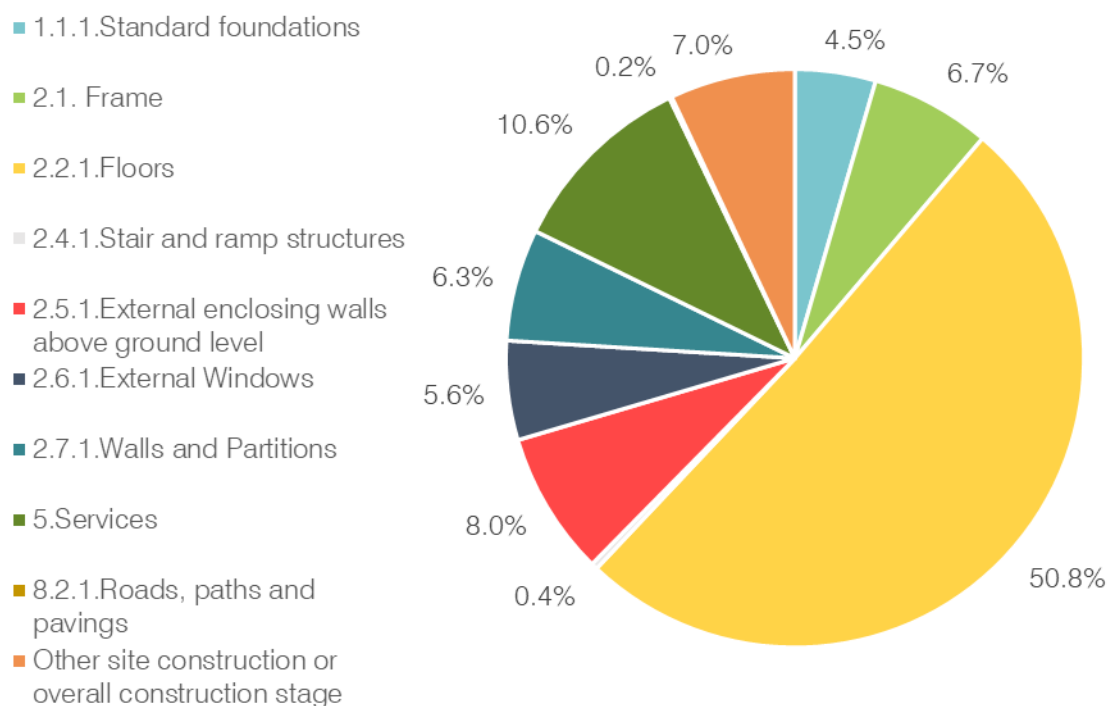


Figure 2 Embodied carbon by building element.

As demonstrated in Figure 1, the primary source of embodied carbon emissions is the upfront emissions associated with the products and materials used in the construction of Postal Street, followed by the replacement of building materials (module B4), attributable to 23% of embodied carbon emissions. This is mainly due to the replacement building services equipment expected between years 20-30 of the building's lifetime.

Figure 2 demonstrates that approximately half of the upfront carbon emissions are attributed to the construction of the building's horizontal structures including all floor slabs, ceilings, roofing decks, beams and roof. These emissions are mainly associated with the large quantities of in-situ concrete and reinforcement steel bar used to construct Postal Street's roof and upper floor slabs, along with the formwork (assumed timber) required during its casting.

4.1 Opportunities to Reduce Embodied Carbon

As the design of Postal Street progresses, there may be opportunities to reduce embodied carbon further. The table below describes the key principles of low carbon design which aim to foster ideas to reduce the embodied carbon and its constituent elements.

Table 4 Opportunities to reduce embodied carbon.

Low Embodied Carbon Design Principle	Design Opportunities
Build Less: <i>Refurbish and Reuse</i>	• Can uses be shared or spaces be multi-functional? • Carry out a material efficiency review - are all materials proposed necessary? • Seek to simplify the design - simple designs usually means less embodied carbon. Does the design represent the most efficient solution?
Build Light: <i>Consider the building structure</i>	• Reduce the weight of the dead loads where possible. • What loadings are really required to meet the brief? • Can long spans be restricted?
Build Wise: <i>Longevity and local context</i>	• Ensure longevity of material and systems specifications. Review material efficiency options. • Are there locally sourced material options, reducing transport to site. • Reusing excavated materials and reducing the amount removed from site.

Build Low Carbon: Review material specifications	• Reduce the use of high embodied carbon materials. • Identify 'Big ticket Items' and focus on the big wins first including structure and envelope (design option appraisals). • Consider natural and renewable materials.
Build for the Future: Assess end-of-life and adaptability	• Ensure future uses and end-of-life are considered and adaptability is designed in. • Mechanically fix systems rather than adhesive fix so they can be demounted and re-used or recycled, supporting a circular economy. • Explore methods of creating longevity for materials without additional coatings, as they can reduce the recyclability of the material.
Build Collaboratively: Involve the whole design team	• Solutions must involve the whole design team and the client. • Ensure that the Embodied carbon results are analysed alongside the design and at each relevant RIBA stage.

5.0 Performance Against Industry Benchmarks

A comparison between the upfront embodied carbon calculated for Postal Street and the LETI Climate Emergency Design Guide targets is shown in the table below.

Table 5 Postal Street embodied carbon performance against LETI targets.

LETI Climate Emergency Design Guide	Baseline	Best Practice 2020	Best Practice 2030	Postal Street
Upfront Embodied Carbon (kgCO ₂ e/m ²)	800	<500	<300	483

*Targets consider a building's upfront embodied carbon only (modules A1-A5).

The results show that the Postal Street's design is making improvements upon the LETI Climate Emergency Design Guide upfront emissions baseline and best practice target for buildings designed after 2020. However, the current design's upfront embodied carbon is yet to meet the LETI's aspirational target for upfront emissions for buildings designed after 2030. Postal Street's current design would therefore achieve an orange or 'C' band rating in accordance with LETI guidance as demonstrated in the figures below.

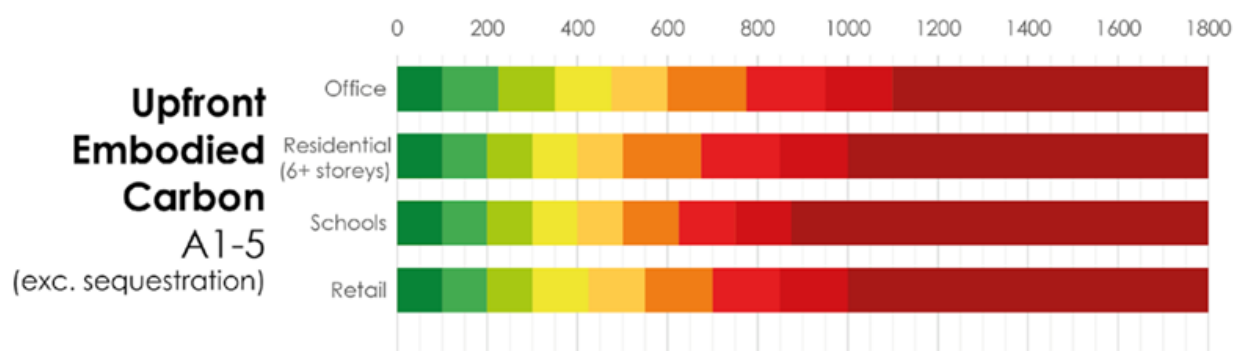


Figure 3 LETI upfront embodied carbon targets by building type.

As stated within UKGBC guidance, the LETI 2030 target is considered to be a “stretch” design scenario, which is demonstrably challenging to achieve and would result in a significant capital cost uplift in today's market conditions. Sources of additional costs are primarily related to the specification of low-carbon materials and use of innovative low-carbon design and construction practices such as targeting reused materials, adaptive reuse of existing spaces and using sustainably sourced timbers.

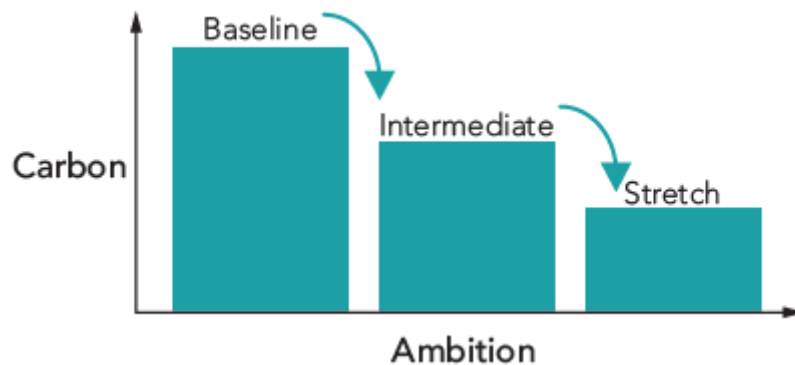


Figure 4 UKGBC embodied carbon design scenarios based on the LETI Climate Emergency Design Guide Targets for upfront embodied carbon.

Achieving the LETI 2030 upfront embodied carbon target is therefore highly dependant on viability and cost considerations.

Approaches to reducing the upfront embodied carbon off Postal Street further and progress towards the RIBA 2030 target may include, but are not limited to, exploring the use of recycled and locally-sourced materials; ensuring longevity of material systems and specifications; and designing the building to be adaptable and consider future uses and end-of-life.

It is important to consider the uncertainties associated with this early stage embodied carbon assessment which has been completed based on the information available including estimated material quantities; assumed design specifications; generic datasets; and partially incomplete data. This is typical for a Stage 2 Embodied Carbon Assessment as some design specifications may not currently be detailed or measured.

Despite the uncertainty in results, this assessment highlights the importance of considering and quantifying embodied carbon at an early design stage to identify aspects of the design that are large emitters of carbon so that options to reduce embodied carbon further can be explored during design development.

6.0 Conclusions – Next Steps

An Embodied Carbon Assessment has been undertaken by Hannan Associates to quantify the whole life embodied carbon of the proposed Postal Street development in the Northern Quarter of Manchester City Centre. The assessment has utilised the information available at this early design stage including a Stage 2 Cost Plan and drawings to estimate materials quantities and specifications and obtain carbon emissions results using One Click LCA software.

The assessment considers the A1 to C4 life cycle stages of the building in accordance with the LETI methodology for an embodied carbon assessment over a 60-year study period. This ensures that the value for upfront embodied carbon is comparable to the best practice design targets set within the LETI Climate Emergency Design Guide, published 2020.

The whole life embodied carbon of Postal Street, based on its current design is estimated to be equivalent to 728 kgCO₂/m². Upfront embodied carbon (modules A1-A5) is equivalent to 483 kgCO₂/m². Of this, 59% is attributable to building materials, of which the primary contributors are the large quantities of in-situ concrete and reinforcement steel bar used to construct Postal Street's roof and upper floor slabs, along with the formwork (assumed timber) used during its construction.

The results show that the design of Postal Street exceeds the LETI Climate Emergency Design Guide upfront emissions baseline and best practice target for buildings designed after 2020. It is recommended that this report is used to inform materials and construction decisions as the design of Postal Street progresses and for the developer to consider further opportunities to limit and reduce embodied carbon. Measures to mitigate embodied carbon include dematerialisation; the use of low embodied carbon materials; waste reduction as well as designing the building to consider its adaptability, longevity and end-of-life.

This report demonstrates that embodied carbon has been quantified and considered at this early design stage in accordance with Policy JP-S2.

RICS Group	Element/Sub-element	Class	Element Detail	Description of allowance	Unit	Quantity
1	SUBSTRUCTURE					
1.1	Substructure					
1.1.1.Standard foundations	Piles / Pile Caps	Foundation	Excavate to reduce levels - inclusive disposal off site + temporary support to adjacent footpaths	Excluded	m2	799
1.1.2.Specialist foundations	Piles / Pile Caps	Foundation	Piling mat; assumed 500mm	Included	m3	399.5
1.1.2.Specialist foundations	Piles / Pile Caps	Foundation	Piling - all in rate	Excluded	unit	202
1.1.1.Standard foundations	Piles / Pile Caps	Foundation	Excavate for pile caps / ground beams + disposal of material off site	Included	m3	436
1.1.2.Specialist foundations	Piles / Pile Caps	Foundation	In-situ concrete to pile caps / ground beams, includes core rafts	Included	m3	396
1.1.2.Specialist foundations	Piles / Pile Caps	Foundation	Reinforcement to pile caps / ground beams	Included	ton	60
1.1.2.Specialist foundations	Piles / Pile Caps	Foundation	Formwork to pile caps / ground beams	Included	m2	591
1.1.1.Standard foundations	Piles / Pile Caps	Foundation	Working space / earthwork support	Excluded	m2	709
1.1.1.Standard foundations	Piles / Pile Caps	Foundation	blinding to pile caps and ground beams	Included	m3	19.8
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Blinding	Included	m2	1248
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	In-situ concrete	Included	m3	343
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Reinforcement; 200kg/m3, 275mm thick	Included	ton	68
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Formwork	Included	m	191
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Surface finish	Included	m2	1248
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Damp-proof membrane	Included	m2	1248
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Insulation	Included	m2	1248
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Allowance for brickwork up to damp-proof cours level	Included	m2	191
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Damp-proof course	Included	m	191
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Allowance for airbricks etc.	Included	unit	191
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Void former or similar to raise floor level on duplex units at ground floor; assumed sum of duplex floor areas	Included	m2	433
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	In-situ concrete to upstand / retaining wall	Included	m3	40.63
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Reinforcement to upstand / retaining wall	Included	ton	8
1.1.3.Lowest floor construction	Suspended Ground Slab	Slab	Formwork to upstand / retaining wall	Included	m	239
Not classified	Suspended Ground Slab	Other	Sub-contractors preliminaries; excludes piling and brickwork	Excluded	N /A	15%
2	SUPERSTRUCTURE					
2.1	Frame					
2.1Frame	Frame	Column	In-situ concrete to columns	Included	m3	403
2.1Frame	Frame	Column	Reinforcement to columns; 275kg/m3	Included	ton	109
2.1Frame	Frame	Column	Formwork to columns	Included	m2	2996
2.1Frame	Frame	Internal Wall	In-situ concrete to core walls	Included	m3	445
2.1Frame	Frame	Internal Wall	Reinforment to core walls	Included	ton	66
2.1Frame	Frame	Internal Wall	Formwork to core walls	Included	m2	3588
2.1Frame	Frame	Other	Sub-contractors preliminaries	Excluded	N / A	15%
2.1Frame	Frame	Other	Allowance for lift / stair overrun / access	Excluded	item	1
2.2	Upper Floors					
2.2.1.Floors	Upper Floors	Slab	In-situ concrete	Included	m3	2149.75
2.2.1.Floors	Upper Floors	Slab	Reinforcement	Included	ton	376.21
2.2.1.Floors	Upper Floors	Slab	Formwork - soffit	Included	m2	8599
2.2.1.Floors	Upper Floors	Slab	Formwork - slab edges / openings	Included	m	1664
2.2.1.Floors	Upper Floors	Slab	Surface finish	Included	m2	8599
2.2.1.Floors	Upper Floors	Slab	Sub-contractors preliminaries	Excluded	N /A	15%
2.3	Roof					
2.3.Roofs	Roof	Roof	In-situ concrete	Included	m3	2149.75

2.3.Roofs	Roof	Roof	Reinforcement	Included	ton	58.28
2.3.Roofs	Roof	Roof	Formwork soffit	Included	m2	1310
2.3.Roofs	Roof	Roof	Formwork - slab edges / openings	Included	m	134
2.3.Roofs	Roof	Roof	Surface finish	Included	m2	1310
2.3.Roofs	Roof	Roof	Sub-contractors preliminaries	Excluded	N / A	15%
2.3.Roofs	Roof	Roof	Green Roof -plant areas / below PVs	Included	m2	1310
2.3.Roofs	Roof	Roof	Allowance for automatic opening vents	Included	unit	2
2.3.Roofs	Roof	Roof	Allowance for mansafe / edge protection to plant areas / blue roof	Included	m	263
2.3.Roofs	Roof	Roof	Allowance for plant supports on roof system	Excluded	unit	1
2.3.Roofs	Roof	Roof	Allowance for roof top plant enclosure (assumed no roof)	Included	m2	214
2.4	Stairs & Ramps					
2.4.Stairs and ramps	Stairs & Ramps	Stairs	Concrete stairs	Included	flights	18
2.4.Stairs and ramps	Stairs & Ramps	Stairs	Allowance for balustrades	Excluded	flights	18
2.4.Stairs and ramps	Stairs & Ramps	Stairs	Allowance for internal stairs to duplexes	Included	unit	8
2.4.Stairs and ramps	Stairs & Ramps	Stairs	Allowance for balustrades to rooftop courtyards	Excluded	m	N / A
2.4.Stairs and ramps	Stairs & Ramps	Stairs	Allowance for roof access	Excluded	unit	4
2.5	External Walls					
2.5.External walls	External Walls	External Wall	Facing brickwork cavity wall construction including inner blockwork leaf, forming cavities, insulation, wall ties, membrane.	Included	m2	3858
2.5.External walls	External Walls	External Wall	Extra over 200 deep brickwork reveals	Included	m	2679
2.5.External walls	External Walls	External Wall	Cladding to rear of parapet walls	Included	m2	250
2.5.External walls	External Walls	External Wall	Allowance for capping to walls	Included	m	227
2.5.External walls	External Walls	External Wall	Allowance for masonry support	Included	m	833
2.5.External walls	External Walls	External Wall	Allowance for enhanced louver details within façade; incuded in windows below	Excluded	unit	N / A
2.6	Windows & External Doors					
2.6.Windows and external doors	External Windows	Window	Composite windows	Included	m2	843
2.6.Windows and external doors	External Windows	Window	Spandrel panel to windows	Included	m2	403
2.6.Windows and external doors	External Windows	Window	Louvers to Window heads	Included	unit	370
2.6.Windows and external doors	External Doors	Door	Secured by Design entrance doors	Excluded	unit	112
2.6.Windows and external doors	External Doors	Door	Allowance for GF Double Entrance Doors	Excluded	unit	2
2.6.Windows and external doors	External Doors	Door	Allowance for GF Single Entrance Doors	Excluded	unit	1
2.6.Windows and external doors	External Doors	Door	External double doors to plant rooms	Excluded	unit	5
2.6.Windows and external doors	External Windows	Window	Allowance for louvers at GR / Roof level	Excluded	unit	1
2.6.Windows and external doors	External Windows	Window	Allowance for solar shading	Excluded	m	N /A
2.6.Windows and external doors	External Windows	Window	Ground floor curtain wall	Inlcuded	m2	132
2.7	Internal Walls & Partitions					
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Party walls and corridors	Excluded	m	2074
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Party walls and corridors - Ground Floor	Excluded	m	140
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Apartment partition walls	Excluded	m	2191
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Apartment partition walls - Ground Floor	Excluded	m	144

2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Allowance for wall linings	Excluded	m2	3549
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Walls to ground floor / core	Excluded	m	495
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Walls to plant spaces	Excluded	m2	273.75
2.7.Internal walls and partitions	Internal Walls & Partitions	Internal Wall	Allowance for windposts	Excluded	unit	1
2.8	Internal Doors					
2.8.Internal doors	Internal Doors	Door	Internal single doorsets; inclusive frames and ironmongery	Excluded	unit	582
2.8.Internal doors	Internal Doors	Door	Communal single doorsets; inclusive frames and ironmongery	Excluded	unit	66
2.8.Internal doors	Internal Doors	Door	Double doorsets to MEP cupboards within apartments; inclusive acoustic seals	Excluded	unit	135
2.8.Internal doors	Internal Doors	Door	Internal double doorsets to core / risers	Excluded	unit	7
2.8.Internal doors	Internal Doors	Door	Architraves	Excluded	m	79000
3	INTERNAL FINISHES					
3.1	Wall Finishes					
3.1.Wall finishes	Wall Finishes	Finish	Matt emulsion to walls generally	Excluded	m2	26832
3.1.Wall finishes	Wall Finishes	Finish	Ceramic tiling to bathrooms and ensuits	Excluded	m2	included above
3.2	Floor Finishes					
3.2.Floor finishes	Floor Finishes	Finish	Leveling screed + damp proof membrane	Excluded	m2	9907
3.2.Floor finishes	Floor Finishes	Finish	Insulation to ground floor	Excluded	m2	included above
3.2.Floor finishes	Floor Finishes	Finish	Karndean or similar	Excluded	m2	3806
3.2.Floor finishes	Floor Finishes	Finish	Carpets to bedrooms	Excluded	m2	2259
3.2.Floor finishes	Floor Finishes	Finish	Carpets to communal areas	Excluded	m2	1206
3.2.Floor finishes	Floor Finishes	Finish	Carpets to stairs	Excluded	flights	18
3.2.Floor finishes	Floor Finishes	Finish	Carpets to duplex stairs	Excluded	flights	8
3.2.Floor finishes	Floor Finishes	Finish	Skirtings including decoration	Excluded	m	13478
3.2.Floor finishes	Floor Finishes	Finish	Finishes to ground floor lobby	Excluded	m2	68
3.2.Floor finishes	Floor Finishes	Finish	Finishes to ground floor sprinkler tanks	Excluded	m2	57
3.2.Floor finishes	Floor Finishes	Finish	Finishes to back of house / plant	Excluded	m2	190
3.2.Floor finishes	Floor Finishes	Finish	Residents amenity / community space	Excluded	m2	326
3.2.Floor finishes	Floor Finishes	Finish	Allowance for trims / tranistion strips / etc.	Excluded	unit	1
3.3	Ceiling Finishes					
3.3.Ceiling finishes	Ceiling Finishes	Finish	Plasterboard ceilings inclusive plaster finish and matt emulsion	Excluded	m2	9907
3.3.Ceiling finishes	Ceiling Finishes	Finish	Allowance for access hatches	Excluded	unit	224
3.3.Ceiling finishes	Ceiling Finishes	Finish	Sound insulation for plant rooms	Excluded	m2	185
3.3.Ceiling finishes	Ceiling Finishes	Finish	Acoustic ceiling to units below ASHP plant	Excluded	m2	240
3.3.Ceiling finishes	Ceiling Finishes	Finish	Sound absorption ceilings to corridors	Excluded	m2	653
4	FITTINGS FURNISHINGS & EQUIPMENT					
4.1	General Fittings, Furnishings & Equipment					
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance for built in wardrobes	Excluded	unit	N / A
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance for kitchens to 1 beds	Excluded	unit	41
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance for kitchens to 2 beds	Excluded	unit	58
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance for kitchens to 3 beds	Excluded	unit	12
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance for kitchens to 4 beds	Excluded	unit	1
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance fore FFE to entrance lobby	Excluded	unit	1

4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Allowance for FFE to apartments	Excluded	unit	112
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Centralised post boxes	Excluded	unit	112
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	Concierge desk; assumes all other furniture etc. provided under OPEX budget	Excluded	unit	1
4.Fittings, furnishings and equipment	Fittings, Furnishings & Equipment	Finish	FFE to the residents amenity space	Excluded	unit	1
5	SERVICES					
5.1	Sanitary Installations					
5.1.Sanitary installations	Sanitary Installations	Systems	Bathroom pods	Excluded	unit	112
5.1.Sanitary installations	Sanitary Installations	Systems	Ensuite pods	Excluded	unit	14
5.1.Sanitary installations	Sanitary Installations	Systems	WC installations to duplex units and ground floor amenity spaces	Excluded	unit	8
5.2	Services Equipment					
5.2.Services equipment	Services Equipment	Systems	N / A	Excluded	unit	N / A
5.3	Disposal Installations					
5.3.Disposal installations	Disposal Installations	Systems	Disposals (risers / stacks)	Excluded	unit	112
5.3.Disposal installations	Disposal Installations	Systems	Cleaners store disposals (risers / stacks)	Excluded	unit	1
5.3.Disposal installations	Disposal Installations	Systems	Waste connections to 1 bed apartments	Excluded	unit	41
5.3.Disposal installations	Disposal Installations	Systems	Waste connections to 2 bed apartments; inlcudes duplexes	Excluded	unit	58
5.3.Disposal installations	Disposal Installations	Systems	Waste connections to 3 bed apartments; includes duplexes	Excluded	unit	12
5.3.Disposal installations	Disposal Installations	Systems	Waste connections to 4 bed apartments	Excluded	unit	1
5.3.Disposal installations	Disposal Installations	Systems	Waste connections to cleaners	Excluded	unit	1
5.3.Disposal installations	Disposal Installations	Systems	Rainwater stacks	Excluded	unit	112
5.4	Water Installation					
5.4.Water installations	Water Installation	Systems	Storage Tank	Excluded	unit	1
5.4.Water installations	Water Installation	Systems	Booster set/pumps	Excluded	unit	1
5.4.Water installations	Water Installation	Systems	Plantroom pipework	Excluded	unit	1
5.4.Water installations	Water Installation	Systems	Hot and cold water - cleaners sinks	Excluded	unit	1
5.4.Water installations	Water Installation	Systems	Hot and cold water - all units	Excluded	unit	112
5.4.Water installations	Water Installation	Systems	Hot water generation	Excluded	unit	112
5.5	Heat Source					
5.5.Heat source	Heat Source	Systems	See below	Inlcuded	N / A	N / A
5.6	Space Heating & Air Conditioning					
5.6.Space heating and Airconditioning	Space Heating & Air Conditioning	Systems	ASHPs & primary distribution	Included	unit	112
5.6.Space heating and Airconditioning	Space Heating & Air Conditioning	Systems	Pipework / radiator installations - 1 bed	Included	unit	41
5.6.Space heating and Airconditioning	Space Heating & Air Conditioning	Systems	Pipework / radiator installations - 2 bed	Included	unit	58
5.6.Space heating and Airconditioning	Space Heating & Air Conditioning	Systems	Pipework / radiator installations - 3 bed	Included	unit	12
5.6.Space heating and Airconditioning	Space Heating & Air Conditioning	Systems	Pipework / radiator installations - 4 bed	Included	unit	1
5.6.Space heating and Airconditioning	Space Heating & Air Conditioning	Systems	Pipework / radiator installations - communal	Included	unit	10
5.7	Ventilation Systems					
5.7.Ventilation systems	Ventilation Systems	Systems	MVHR installation	Included	unit	112
5.7.Ventilation systems	Ventilation Systems	Systems	E/o for enhanced MVHR for purge ventilation	Excluded	unit	112
5.7.Ventilation systems	Ventilation Systems	Systems	Smoke ventilation	Included	floors	10
5.8	Electrical Installations					
5.8.Electrical installations	Electrical Installations	Building Technology	Primary Panel and distribution	Excluded	m2	9907
5.8.Electrical installations	Electrical Installations	Building Technology	Mains and sub-mains distributions (vertical busbar)	Excluded	m2	9907

5.8.Electrical installations	Electrical Installations	Building Technology	Primary containment	Excluded	m2	9907
5.8.Electrical installations	Electrical Installations	Building Technology	Secondary containment	Excluded	m2	9907
5.8.Electrical installations	Electrical Installations	Building Technology	Electrical power supplies to communal areas (clearners sockets / radiator supplies)	Excluded	unit	112
5.8.Electrical installations	Electrical Installations	Building Technology	General power supplies to apartments - 1 bed apartments	Excluded	unit	41
5.8.Electrical installations	Electrical Installations	Building Technology	General power supplies to apartments - 2 bed apartments	Excluded	unit	58
5.8.Electrical installations	Electrical Installations	Building Technology	General power supplies to apartments - 3 bed apartments	Excluded	unit	12
5.8.Electrical installations	Electrical Installations	Building Technology	General power supplies to apartments - 4 bed duplex	Excluded	unit	1
5.8.Electrical installations	Electrical Installations	Building Technology	Mechanical power supplies	Excluded	unit	1
5.8.Electrical installations	Electrical Installations	Building Technology	Lighting to communal areas	Excluded	m2	1206
5.8.Electrical installations	Electrical Installations	Building Technology	Extra over for feature lighting	Excluded	unit	1
5.8.Electrical installations	Electrical Installations	Building Technology	Lighting to apartments - 1 bed	Excluded	unit	41
5.8.Electrical installations	Electrical Installations	Building Technology	Lighting to apartments - 2 bed	Excluded	unit	58
5.8.Electrical installations	Electrical Installations	Building Technology	Lighting to apartments - 3 bed	Excluded	unit	12
5.8.Electrical installations	Electrical Installations	Building Technology	Lighting to apartments - 4 bed	Excluded	unit	1
5.8.Electrical installations	Electrical Installations	Building Technology	Lighting to Plant rooms and ancillary space	Excluded	unit	1
5.8.Electrical installations	Electrical Installations	Building Technology	Provisional allowance for external building mounted feature lighting	Excluded	unit	1
5.8.Electrical installations	Electrical Installations	Building Technology	Emergency Lighting Installations to communal spaces	Excluded	m2	1206
5.8.Electrical installations	Electrical Installations	Building Technology	Standby Generator - assumed located at ground floor	Excluded	unit	1
5.9	Fuel Installations					
5.9.Fuel installations and systems	Fuel Installations	Building Technology	N / A	Included	unit	N /A
5.10	Lift & Conveyor Installations					
5.10.Lift and conveyor or installations/systems	Lifts	Building Technology	Allowance for lift installations; includes allowance for decoration to lift shafts	Excluded	unit	2
5.11	Fire & Lighting Protection					
5.11.Fire and lightning protection	Fire & Lighting Protection	Building Technology	DRY Riser - residential landsings, tanks and pump	Excluded	floors	10
5.11.Fire and lightning protection	Fire & Lighting Protection	Building Technology	Sprinkler installations to residential areas (exclusive tank measured separately)	Excluded	unit	112
5.11.Fire and lightning protection	Fire & Lighting Protection	Building Technology	Lighting Protection	Excluded	m2	9907
5.12	Communications, Security and Control Systems					
5.12.Communication, Security and Control Systems	Communications, Security and Control Systems	Building Technology	Fire alarm systems	Excluded	unit	112
5.12.Communication, Security and Control Systems	Communications, Security and Control Systems	Building Technology	Access Control - main entrance	Excluded	unit	1
5.12.Communication, Security and Control Systems	Communications, Security and Control Systems	Building Technology	CCTV - main entrance and lift lobbies and control in reception & Courtyard	Excluded	unit	1
5.12.Communication, Security and Control Systems	Communications, Security and Control Systems	Building Technology	Access Control (with intercom) - to all units	Excluded	unit	112
5.12.Communication, Security and Control Systems	Communications, Security and Control Systems	Building Technology	TV installations	Excluded	unit	112
5.12.Communication, Security and Control Systems	Communications, Security and Control Systems	Building Technology	Disabled refuge - all floors	Excluded	unit	10
5.13	Specialist Installations					
5.13.Special installations	Specialist Installations	Building Technology	Allowance for PV panels	Excluded	unit	1
5.13.Special installations	Specialist Installations	Building Technology	BMS / Controls	Excluded	unit	112
5.13.Special installations	Specialist Installations	Building Technology	MEP Contractors Prelims	Excluded	%	10
5.14	Builder's Work in Connection with Services					
5.14.Builder's work in connection with services	Builder's Work in Connection with Services	Other	Allowance of 5%	Excluded	%	5
7	WORKS TO EXISTING BUILDING					
7.1	Minor Demolition Works and Alteration Works					

7.1.Minor demolition and alteration works	Minor Demolition Works and Alteration Works	Other	N / A	Excluded	unit	N / A
7.2	Repairs to Existing Services					
7.2.Repairs to existing services	Repairs to Existing Services	Other	N / A	Excluded	unit	N / A
7.3	Damp-proof Course/Fungus and Beetle Eradication					
7.3.Damp-proof courses/fungus and beetle eradication	Damp-proof Course/Fungus and Beetle Eradication	Other	N / A	Excluded	unit	N / A
7.4	Façade Retention					
7.4.Façade retention	Façade Retention	Other	N / A	Excluded	unit	N / A
7.5	Cleaning Existing Surfaces					
7.5.Cleaning existing surfaces	Cleaning Existing Surfaces	Other	N / A	Excluded	unit	N / A
7.6	Renovation Works					
7.6.Renovation works	Renovation Works	Other	N / A	Excluded	unit	N / A
8	EXTERNAL WORKS					
8.1	Site Preparation Works					
8.1.Site preparation works	Site Preparation Works	Site	N / A	Excluded	unit	N / A
8.2	Roads, Paths, Pavings & Surfacing					
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	Allowance for re-paving to site perimeter; includes footpath, kerb line, tactile paving	Included	m2	362
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	Allowance for new public realm	Included	m2	N / A
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	Allowance for making good following construction	Excluded	unit	1
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	Crushed stone to underside of paving (site won 6F2)	Included	m2	230
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	Paving	Included	m2	146
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	Planting	Excluded	item	1
8.2.1.Roads, paths and pavings	Roads, Paths, Pavings & Surfacing	Site	External Furnishing	Excluded	item	1
8.3	Soft Landscaping, Planting & Irrigation Systems					
8.3.1.Seeding and turfing	Soft Landscaping, Planting & Irrigation Systems	Site	Planting	Excluded	item	1
8.4	Fencing, Railings & Walls					
8.4.1.Fencing and railings	Fencing, Railings & Walls	Site	Allowance for gates to Courtyard	Excluded	item	1
8.5	External Fixtures					
8.5.1.Site/Street furniture and equipment	External Fixtures	Site	Allowance	Excluded	item	1
8.5.1.Site/Street furniture and equipment	External Fixtures	Site	Allowance for cycle parking	Excluded	item	200
8.6	External Drainage					
8.6.1.Surface water and foul water drainage	External Drainage	Site	Allowamce for surface water and foul drainage; based on new GIA allowance	Excluded	m2	9907
8.6.1.Surface water and foul water drainage	External Drainage	Site	Attenuation - SUDs	Excluded	m2	1
8.7	External Services					
8.7.11.Builder's work in connection with external services	External Services	Site	Service diversion	Excluded	item	1
8.7.2.Electricity mains supply	External Services	Site	Allowance for electrical supplies	Excluded	item	1
8.7.6.Telecommunications and other communication system connections	External Services	Site	Allowance for incoming data	Excluded	item	1
8.7.1.Water mains supply	External Services	Site	Allowance for incoming water	Excluded	item	1

8.7.9.External/Street lighting systems	External Services	Site	Allowance for street external lighting	Excluded	item	1
8.7.11.Builder's work in connection with external services	External Services	Site	Allowance for disconnection of on site services	Excluded	item	1
8.7.9.External/Street lighting systems	External Services	Site	Courtyard / Building Lighting	Excluded	item	1
8.8	Minor Building Works and Ancillary Buildings					
8.8.2.Ancillary buildings and structures	Minor Building Works and Ancillary Buildings	Site	N / A	Excluded	item	N / A
9	MAINTENANCE CONTRACTOR'S PRELIMINARIES					
9.1	Client's Requirements					
9.Main Contractor's Preliminaries	Client's Requirements	Other	N /A	Excluded	item	1
9.Main Contractor's Preliminaries	Client's Requirements	Other	N /A	Excluded	item	1
9.2	Main Contractor's Cost Items					
9.Main Contractor's Preliminaries	Client's Requirements	Other	N / A	Excluded	item	1
10	MAINTENANCE CONTRACTOR'S OVERHEAD & PROFIT					
10.1	Maintenance Contractor's Overheads					
10.1.Maintenance Contractor's Overheads	Maintenance Contractor's Overheads	Other	N /A	Excluded	item	1
10.2	Maintenance Contractor's Profit					
10.2.Maintenance Contractor's Profit	Maintenance Contractor's Profit	Other	N / A	Excluded	item	1

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