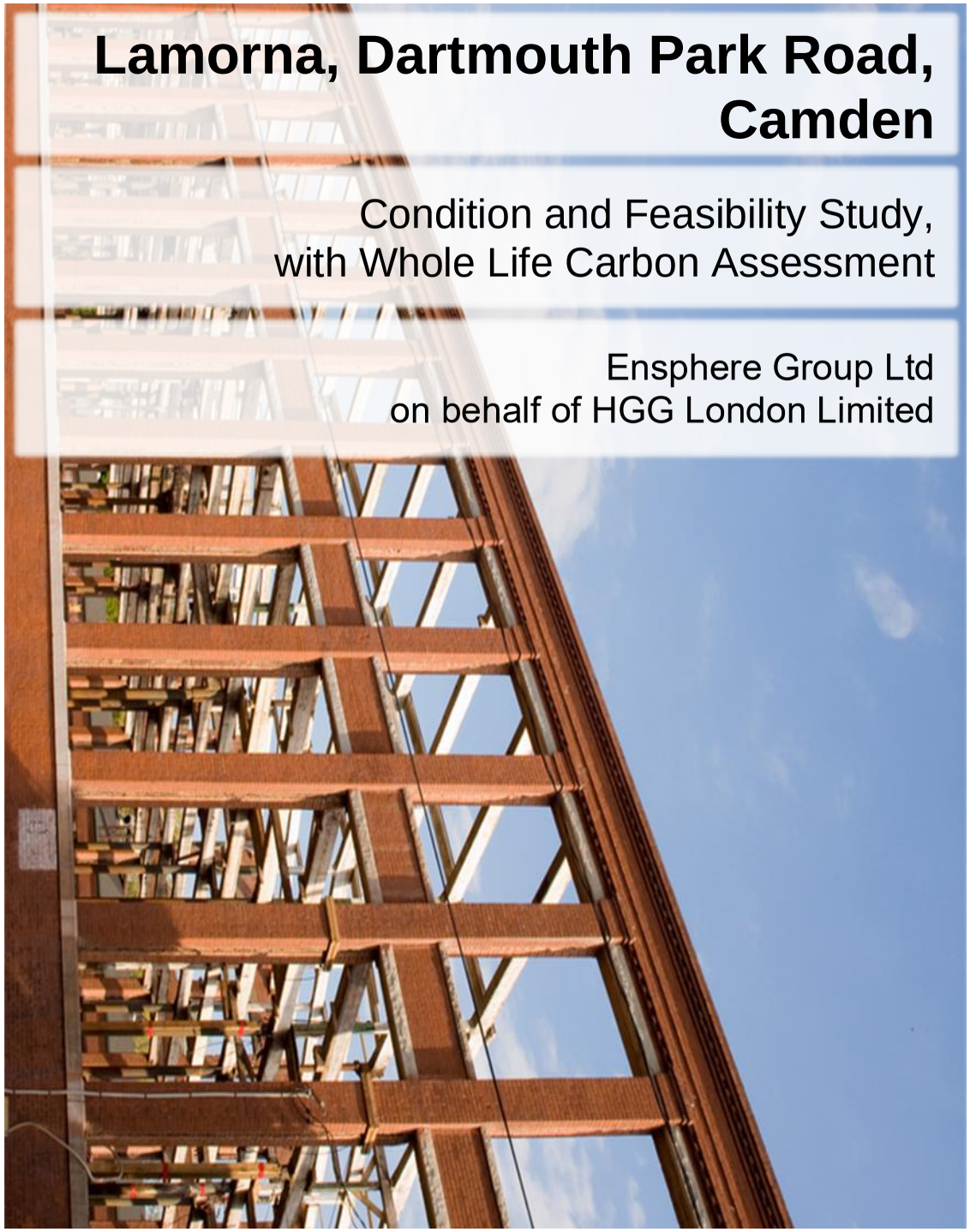
Lamorna, Dartmouth Park Road, Camden

Condition and Feasibility Study, with Whole Life Carbon Assessment

Ensphere Group Ltd
on behalf of HGG London Limited



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Contents

1. Executive Summary

1.1 This report is the Condition and Feasibility Study, with Whole Life Carbon Assessment for the proposed scheme at Lamorna, Dartmouth Park Road, London, NW5 1SU.

1.2 The proposed scheme includes the demolition of existing single-family dwelling and construction of a new five-storey plus basement residential building consisting of 6x self-contained residential flats (Class C3).

1.3 This Condition and Feasibility Study seeks to understand the reuse potential of the existing building on Site. Whole life carbon emissions will also be estimated by assessing all stages of the proposed project, alongside a theoretical refurbishment scenario for the existing property, from raw material extraction, product manufacturing, transport, and installation on site through to the operation, maintenance, and eventual material disposal

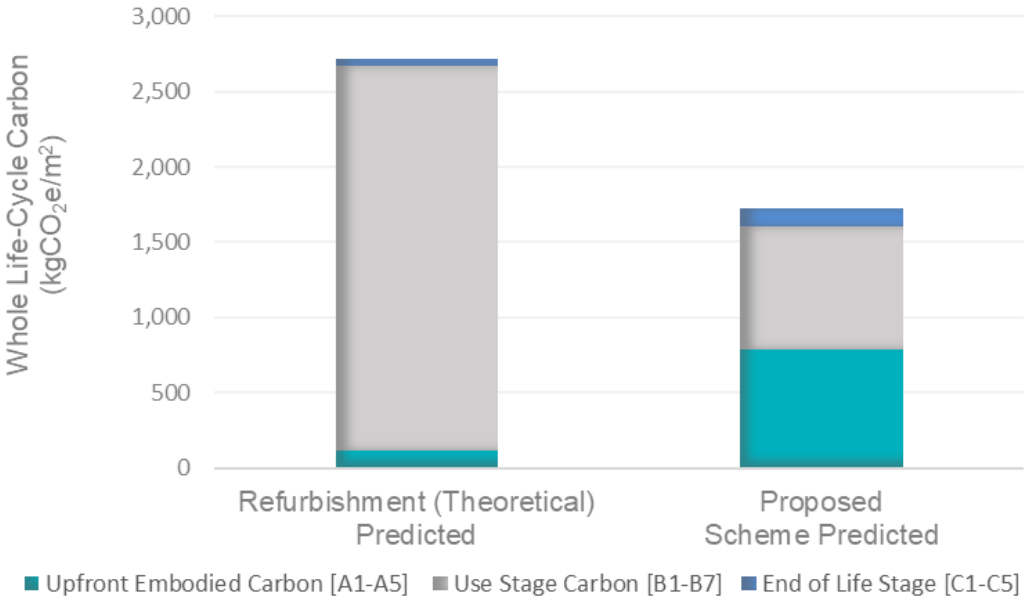
1.4 Consideration has primarily been given to the planning policy and other relevant standards and guidance prior to specifying the assessment object.

1.5 Best available data has been used, with the acknowledgement that this assessment for the proposed scheme has been undertaken at a relatively early stage of design. Furthermore, refurbishment of the existing property is not considered viable and, therefore, the assessment of this scenario has been undertaken for comparison purposes only and as such, various assumptions were made in terms of the extent of refurbishment works.

1.6 Specialist software has been used with emissions calculated using the One Click LCA software, utilising the GLA compliant & EN15804 +A2 data supported, and Carbon Designer 3D LCA calculation tools.

1.7 The assessment has reviewed WLC over a 60-year period, in line with the recommended RICS approach. This identified total WLC emissions for the proposed scheme of 1,074,965 $kgCO_2e$, equivalent to ~1,649 $kgCO_2e/m^2$. In comparison, assessment of the refurbishment of the existing building identified WLC emission of 406,040 $kgCO_2e$, equivalent to ~ 2,693 $kgCO_2e/m^2$.

Figure 1.1 Proposed Scheme vs Theoretical Refurbishment Scenario Whole Life-Cycle Carbon Emissions - Excluding Biogenic Carbon ($kgCO_2e/m^2$)



1.8 Overall, the Whole Life-Cycle Carbon Assessments undertaken indicate that the proposed scheme would be responsible for approximately 39% less carbon emissions per square metre over its lifetime relative to the theoretical refurbishment of the existing building. This is largely due to the existing building being reliant on gas boilers, whereas the proposed scheme incorporates highly efficient Air Source Heat Pumps (ASHPs), which significantly reduces operational energy use over the 60-year period.

1.9 The assessment of Whole Life Carbon has shown that the proposed scheme will likely have benefits in terms of emissions, such as by reducing operational energy use. In addition to this, the current single-family dwelling building would be difficult to reconfigure and refurbish to provide additional dwellings. Given the high accessibility of the Site, maximising use of the land for provision of additional residential dwellings is considered central to achieving optimal site capacity. Furthermore, the redevelopment on brownfield land will also reduce the pressure to develop elsewhere and on greenfield.

2. Introduction

2.1 Ensphere Group Ltd was commissioned by HGG London Limited to produce a Condition and Feasibility Study, with Whole Life Carbon Assessment, for the proposed development at Lamorna, Dartmouth Park Road, London, NW5 1SU.

Site & Surroundings

2.2 The application site (the 'Site') is located on the south side of Dartmouth Park Road, east of the junction with Highgate Road. The site currently comprises a two-storey detached dwelling (Class C3) of early 20th century construction, known as 'Lamorna'. The subject building is not listed and is not mentioned within the Dartmouth Park Conservation Area Appraisal.

2.3 The Site is located within the ward of Highgate, which is in the north of the London Borough of Camden, with Hampstead Heath to the west.

2.4 The immediate surroundings of the Site are largely characterised by residential dwellings; however, a mixture of shops and restaurants can be found running along Highgate Road and on York Rise Road, located on the east end of Dartmouth Park Road. The site is located near Grade II and Grade II* listed buildings along Grove Terrace and Grove End.

Figure 2.1 Street elevation along Dartmouth Park Road showing the neighbouring existing buildings (Bureau de Change, February 2023)

2.5 The Site has a PTAL score of 4 which indicates that it has a good level of accessibility by public transport. The site is situated ~500m from Gospel Oak Overground Station, ~850m from Tufnell

Park Underground Station, and 1km from Kentish Town Underground Station. Local bus stops are also located close to the site at the junction of Dartmouth Park Road and Highgate Road.

Proposed Development

2.6 Proposals are for the demolition of the existing single-family dwelling and construction of a new five-storey plus basement residential building consisting of 6x self-contained residential flats (Class C3).

Report Objective

2.7 The objective of this study is to look at the opportunities for retention and refurbishment through assessing the condition of the existing building(s) and further exploring future potential of the site.

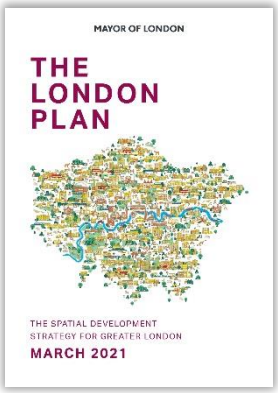
2.8 It will present a high-level overview of the proposed development in the context of the existing Site to understand the reuse potential of the existing building(s) and how the proposals could incorporate circular economy measures. A high-level Whole Life Carbon Assessment is also presented to show the emissions from the proposed development.

3. Planning Context

London Planning Policy

London Plan (2021)

3.1 The London Plan is a broad plan setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The Plan introducing the concept of "Circular Economy", defining it as:



"An economic model in which resources are kept in use at the highest level possible for as long as possible in order to maximise value and reduce waste, moving away from the traditional linear economic model of 'make, use, dispose'."

3.2 Policies considered pertinent this report are listed below:

- Policy D3 (*Optimising Site Capacity Through the Design-led Approach*) - Development proposals should aim for high sustainability standards and take into account the principles of the circular economy.
- Policy SI 2 (*Minimising greenhouse gas emissions*) - Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.
- Policy SI 7 (*Reducing Waste and Supporting the Circular Economy*) – requires applications to promote circular economy outcomes and aim to be net zero-waste. Requires submission of a Circular Economy Statement with referable applications.

London Plan Guidance – Whole Life-Cycle Carbon Assessments (March 2022)

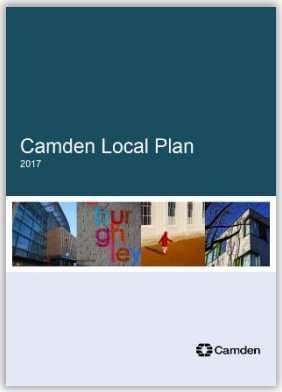
3.3 The guidance document explains how to prepare a WLC assessment which should accompany all referable planning applications in line with the London Plan Policy SI 2. The guidance follows BS EN 15978 using the RICS Professional Statement as the methodology for assessment.

London Plan Guidance – Circular Economy Statements (March 2022)

3.4 This guidance document explains how to prepare a Circular Economy Statement to accompany strategic planning applications referred to the Mayor as set out in London Plan Policy SI7.

Local Context

Camden Local Plan (June 2017)



3.5 The Camden Local Plan sets out the Council's planning policies and was adopted by Council on 3 July 2017. The Local Plan will help deliver the objectives of creating the conditions for harnessing the benefits of economic growth, reducing inequality and securing sustainable neighbourhoods.

3.6 Policies relevant to this report are presented below:

- Policy CC1 (*Climate Change Mitigation*) – promotes zero carbon development and requires all development to reduce carbon in line with the energy hierarchy. It supports and encourages sensitive energy efficiency improvements to existing buildings. It also requires all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building and expects all developments to optimise resource efficiency. In addition to a target 20% reduction from CO2 emissions from on-site renewable energy technologies from Camden's CPG, all new residential developments are also required to demonstrate a 19% CO2 reduction below Part L 2013 Building Regulations, according to Policy CC1.

Camden's Energy Efficiency and Adaptation CPG (2021)

- This document was adopted on 15 January 2021 following statutory consultation and replaces the Energy efficiency and adaptations CPG (March 2019), which replaced the CPG3 Sustainability (July 2015).

- This guidance provides information on key energy and resource issues within the borough and supports Local Plan Policies CC1 (*Climate Change Mitigation)* and CC2 (*Adapting to Climate Change)*.

- Incudes reference to a 20% carbon reduction target using renewables for developments (including refurbishments) of 5 or more dwellings and/or more than 500 sqm of any gross internal floorspace.

- Where developments are likely to be at risk of overheating applicants will be required to complete dynamic thermal modelling to demonstrate that any risk to overheating has been mitigated.

- Assessment tools, such as Passivhaus and Home Quality Mark are "encouraged".

- The document also has a section on reuse and optimising resource efficiency, stating that a Condition and Feasibility Study should be undertaken to understand the reuse potential of the existing building for any development proposing substantial demolition. Taking into

account the condition of the existing building and feasibility of re-use, the refit, refurbish, substantial refurbishment and extension, reclaim and recycle hierarchy should be used to explore all potential options of an existing site.

Camden Retrofitting Planning Guidance (2013 update)

- This guidance has been developed to aid understanding of the planning process required to install low carbon technologies in homes.

4. WLC and Circular Economy Concepts

Whole Life Carbon

4.1 Whole life-cycle carbon ("WLC") emissions are the carbon emissions resulting from materials, construction and use of a building over its entire life, including its demolition and disposal. A whole life carbon approach identifies the overall best combined opportunities for reducing lifetime emissions and helps to avoid unintended consequences of focusing on operational emissions alone.

Circular Economy Aim & Core Principles

4.2 The end goal of the Circular Economy is to retain the value of materials and resources indefinitely, with no residual waste at all.

4.3 The application of Circular Economy philosophy to the built environment is complex, with issues overlapping and trade-offs to consider. Nevertheless, the following promotes some of the core guiding principles that promote a regenerative and restorative whole systems approach.

Table 4.1 Core Principles

Principle	Development commitments to:
1. Conserve resources, increase efficiency and source sustainably	Minimise the quantities of materials used Minimise the quantities of other resources used Specify and source materials and other resources responsibly and sustainably.
2. Design to eliminate waste (and for ease of maintenance)	Design for longevity, adaptability or flexibility and reusability or recoverability Design out construction, demolition, excavation, and municipal waste arising
3. Manage waste sustainably and at the highest value	Manage demolition waste Manage excavation waste Manage construction waste Manage municipal waste (and industrial waste, if applicable)

"Building in Layers"

4.4 A useful way to understand a building or development is in terms of "layers", where each layer has its own lifecycle that may require a different approach (or different solutions) to be adopted.

To support reuse and recycling, the different layers should be independent, accessible and removable whilst maintaining their value, where possible.

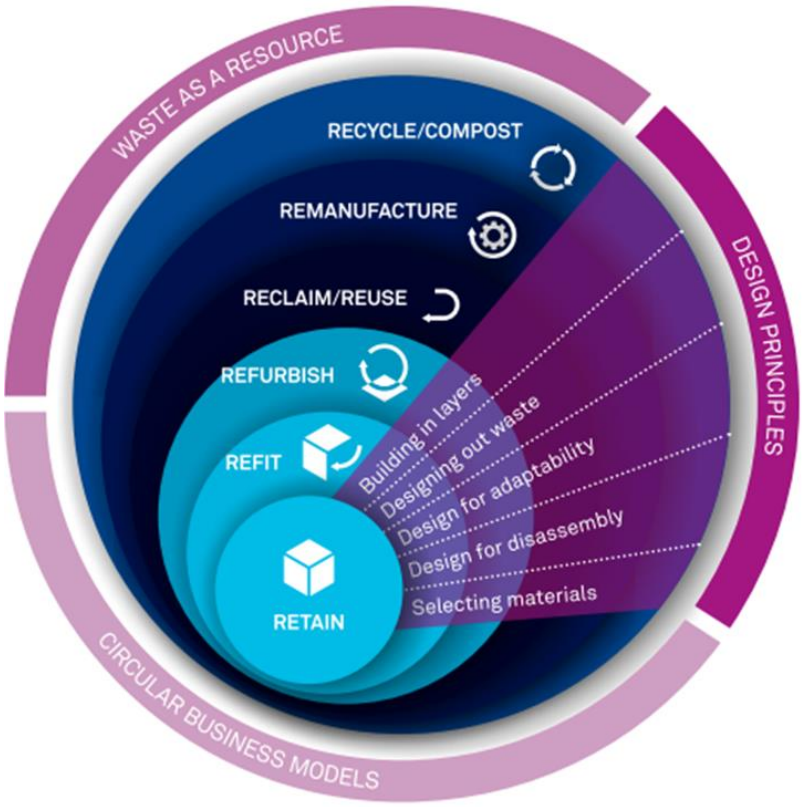
Table 4.2 Building in Layers

Layer	Summary and constituent elements
Site	The geographical setting, urban location, and external works
Substructure	Excavations, foundations, basements, and ground floors
Superstructure	Load-bearing elements above plinth including roof supporting structure
Shell / Skin	The layer keeping out water, wind, heat, cold, direct sunlight, and noise
Services	Installations to ensure comfort, practicality, accessibility, and safety
Space	The layout internal walls, ceilings, floors, finishes, doors, fitted furniture
Stuff	Anything that could fall if the building was turned upside down
Construction Stuff	Any temporary installations/works/materials, packaging, and equipment

Hierarchy for Building Approaches

4.5 The following figure, taken from the London Plan and originally presented in *Building Revolutions (2016), David Cheshire, RIBA Publishing*, presents a hierarchy for building approaches.

Figure 4.1 Circular economy hierarchy for building approaches



5. Method Statement

5.1 This Condition and Feasibility Study seeks to understand the reuse potential of the existing building on Site.

5.2 Local Plan policy CC1 requires all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building, as well as to optimise resource efficiency. The benefits behind retaining and refurbishing buildings, as stated in Camden's Energy Efficiency and Adaptation CPG (2021), include:

- Reduces the requirement for virgin materials and therefore reduces its embodied carbon impact.
- Keeps products and materials at their highest value for as long as possible.
- Maintains heritage value.
- Minimises demolition waste.
- Reduces human disruption of extensive demolition and construction works, associated noise and transport impacts, and likely impact on air quality.
- Cost and programme savings, depending on the scope of refurbishment.
- Achieve BREEAM credits.

5.3 In assessing the opportunities for retention and refurbishment, the condition of the existing building needs to be evaluated to allow future potential of the site to be explored. This study will look at the existing building in the context of its use, servicing, technical potential and site capacity in order to determine the ability to re-use the building.

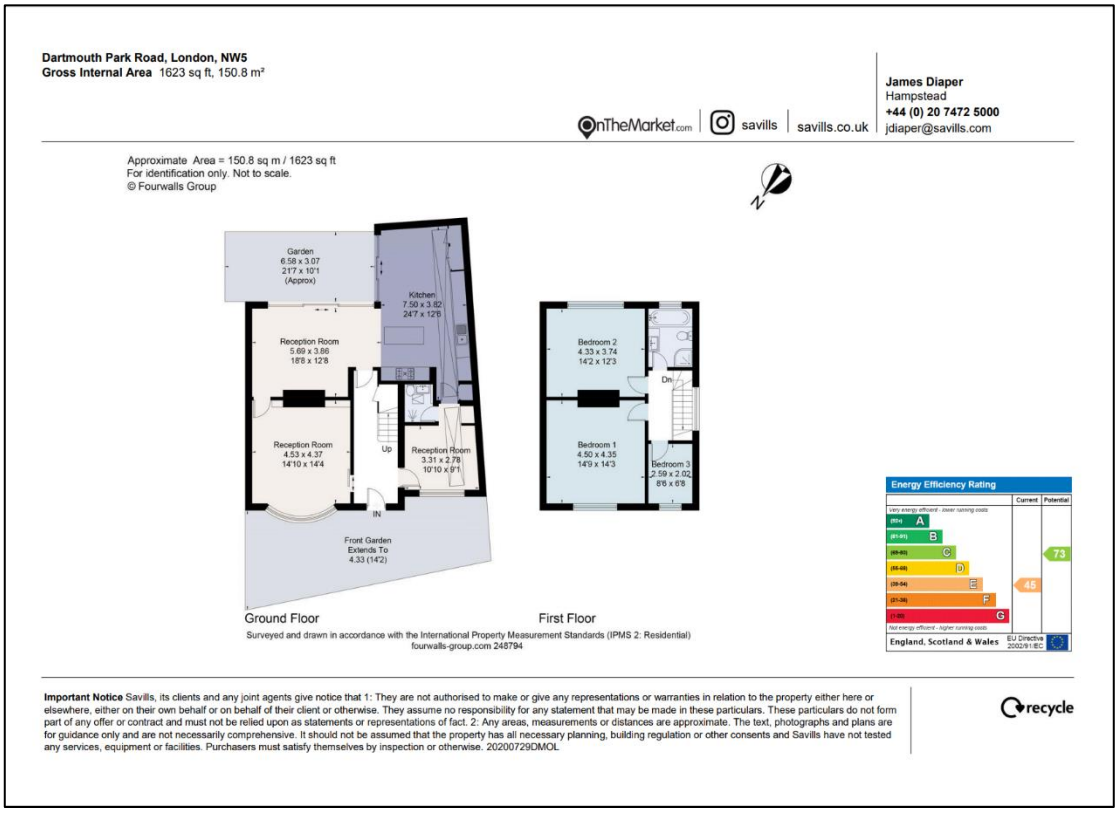
6. Assessment of the Existing Building

6.1 To implement Circular Economy principles most effectively, high level strategic opportunities are being explored early in the development process. Below constitutes a Condition and Feasibility Study, which has been conducted in consideration of Camden's Energy Efficiency and Adaptation CPG (2021) guidance.

Existing Building Use

6.2 The site current comprises a two-storey detached family dwelling (Class C3) of early 20th century construction.

Figure 6.1 Existing Building Plans (Taken from Savills Sales Extract)



Servicing and Technical Review

Operational Energy Performance

6.3 Energy performance certificates (EPCs) are available for the existing building (accessed from the UK Government's website). The following summarises energy performance of the building:

Table 6.1 Existing Estimated Energy Performance (Residential)

Building	Certificate number	Floor Area (m^2)	Energy Rating	Heating Requirements (kWh)

			Current	Potential	Space Heating	Hot Water
Lamorna	8618-7623-0040-4999-8972	137	E - 45	C - 73	21,652	2,968

6.4 Based on the information provided on the EPCs, the following is understood to comprise the energy strategy for the site.

- Main heating fuel is mains gas, via boilers and radiators.
- Low energy lighting is installed in 26% of fixed outlets.
- Limited insulation for floors, roof, and walls is assumed given the building's age, and thus both the wall and roof have a "very poor" rating in terms of energy efficiency. Double glazing is understood to be installed in most openings.

Potential for Energy Use Related Improvements

6.5 The current systems consist of a gas boiler providing heating through conventional radiators and room heaters. Some underfloor heating is also understood to be installed in the living room. Since the main system is mains gas, upgrading the plant to all electrical would be important to allow the development to effectively decarbonise in line with the National Grid. Installing efficient low and zero carbon technologies (such as air source heat pumps) will allow for efficient use of electricity, reducing operational cost for occupants.

6.6 Given the age of the existing building and therefore the likely minimal insulation installed, leakage of heat is expected to be significant. Improved building fabric will reduce the rate at which the building loses heat, preserving the heat within the space and reducing the requirement for mechanical heating.

6.7 Fabric efficiency concerns the thermal properties associated with the building fabric and construction. The performance of the building fabric will need to be improved, particularly in regards to the glazing in order to maximise savings under Part L 2021. Upgrades to existing building fabric could be technically feasible, however this could create issues with moisture build-up and will likely further reduce floor space available.

6.8 Air tightness and thermal bridges will also be difficult to improve significantly. As in well insulated buildings as much as 30% of heat loss can occur through thermal bridges, this could represent a substantial source of heat transfer, meaning heat will not be used efficiently.

Structural Strength

6.9 Assessments concerning the loading capacity of the structural frame, materials strength and pile testing were not available at the time of writing. Given the age of the existing building and current use provision, as well as the site constraints due to its size, any extension to the building

would likely be a complex undertaking, limited by the existing foundation and structure. The potential to offer additional dwellings would also therefore be reduced, especially when considering the requirements of current building regulations. Information from the architect also confirms that the existing building has serious issues with water and air tightness and therefore would require extensive refurbishment of wall fabric, glazing, heating, and ventilation systems, increasing technically feasible and financially viable concerns.

Embodied Carbon

6.10 An estimate of embodied carbon for the existing building is presented in a later section of this report as part of the whole life carbon assessment for a refurbishment scenario.

Site Capacity

6.11 The site constitutes brownfield land, meaning that its development will reduce the pressure to develop elsewhere and on greenfield. Given the high accessibility of the Site, maximising use of the land for provision of additional residential dwellings is considered vital to achieving optimal site capacity.

6.12 Both nationally and regionally there is a shortfall in housing, which is leading to property prices rising significantly faster than earnings, with implications for affordability and ownership.

6.13 The lack of access to housing is often most acutely felt by for those people who are not yet on the housing ladder and who have not benefited in the increase in property asset values. Typically, these people will be the younger and those with lower incomes; the consequence being that the supply and demand imbalance is contributing towards intergenerational inequality by compromising the ability of current and future generations in meeting their own housing needs. This is inconsistent with the principles of “sustainable development” as defined by Brundtland; and if not addressed, will have longer term societal and economic implications.

6.14 A need therefore considered to exist on the basis that it will help relieve anticipated future demand pressures on housing and assist with the rebalancing of the socio-economic factors.

6.15 Given the condition of the existing Site, any new dwelling units would likely be compromised by the existing building arrangement. Increasing insulation and improving energy systems to meet new regulation requirements will also create further issues in terms of space standards. This is therefore not considered best use of the Site.

6.16 In comparison, a new build proposal could lead to optimisation of the Site by delivering high quality dwellings that are much more space efficient and meet London Plan as well as space standard requirements. Chapter 7, ‘Development Options’ explores this further.

7. Development Options

7.1 Considering the condition of the existing building and feasibility of re-use above, the following hierarchy has been used to explore all potential options of an existing site, with the aim of optimising resource efficiency, in line with Camden's Energy Efficiency and Adaptation CPG (2021) guidance.

I. **Refit** - retains the existing structure as is, includes minor works, and the replacement of building services such as heating and insulation, to continue occupation of the building.

II. **Refurbish** - should seek to significantly improve the service life of the existing building. This option provides an opportunity to retrofit the building to reduce carbon emissions and include sustainable adaptation measures.

III. **Substantial Refurbishment and Extension** - like the above but takes into consideration the need to optimise site capacity and alter the existing structure to meet future needs. This may involve significant changes to the façade (façade replacement) but should seek to retain as much of the existing building as possible reducing the need to use new materials and reduce the loss of embodied carbon in the existing structure.

IV. **Reclaim and Recycle** - if above options are not feasible the development proposal should include a pre-demolition audit identifying all materials within the building and documenting how they will be managed. The preference should be for re-use on site, then re-use off site, remanufacture or recycling. At this option a Whole Life Carbon assessment (including embodied carbon) should be submitted.

Development Option Hierarchy Exploration

Refit

7.2 The design team adopt a retrofit-first approach. However, whilst there is potential to refit the existing building, this would not allow for the creation of additional homes. This would not permit achievement of the optimal site capacity outlined above, and by itself would not represent a financially viable option. The option of refit is therefore considered inadequate, given the potential for an alternative highly efficient option that could make better use of the site

Refurbish

7.3 Refurbishment of the existing building to improve fabric is technically feasible, however when compared to a new build development, the savings in operational carbon would be much less pronounced.

7.4 It is also considered difficult to reconfigure and refurbish to provide additional dwellings, as well as meet current space standards. In pre-app discussions, the Council "acknowledges the balance between retention of existing buildings and providing new residential accommodation,

which is a priority need identified and within the borough". In addition, as with the refit option, refurbishment of the building will not allow for additional homes and thus this creates a similar issue in terms of financial viability.

Substantial Refurbishment and Extension

7.5 Substantial refurbishment and extension option could offer the potential for a limited number of additional dwellings and allow for reuse of the existing embodied carbon on Site. The extension would be built in line with new Building Regulation criteria and thus the spaces should be highly efficient in terms of operational energy requirements. Nevertheless, although the energy performance of the existing residential units will also be improved though the refurbishment, operational emissions in these spaces will not be as low as a new build development given limitations associated with improving fabric efficiency of an existing building.

7.6 Moreover, this option would not fully optimise the site's potential in line with Policy D3 of the London Plan 2021, which seeks to make the best use of land. The limited size of the site constrains the extent of the extension, diminishing the overall benefit of this approach. Additionally, it may be challenging to deliver new properties that meet all technical standards, such as private amenity space, refuse and cycle storage, and accessibility requirements. For example, the inclusion of balconies to provide private amenity space could potentially conflict with the design expectations for a development within the Conservation Area.

7.7 Given the above, a substantial refurbishment and extension option is not considered a viable proposal for this Site.

Reclaim and Recycle

7.8 In line with the hierarchy presented above, the final option is to maximise reclamation and recycling of materials.

7.9 The new build proposal is for a new five-storey plus basement residential building consisting of 6x self-contained residential flats which will meet the requirements for amenity, nationally described space standards, and refuse / cycle storage. It would involve the erection of a five-storey (plus basement) building providing self-contained residential dwellings (1x one-bedroom, 4x two-bedroom, 1x three-bedroom units). The development proposals aim to complement the neighbouring buildings and provide high quality homes. Indicative floor plans are appended to this report.

Figure 7.1 Anterior View of Proposal (produced by Stitch)

7.10 The proposal will aim to divert demolition and construction waste from landfill by converting elements and materials for alternative use. The project will aim to divert 95% of demolition and construction waste from landfill.

7.11 An independent pre-demolition audit will be carried out to determine the site-specific opportunities for re-using existing materials and/or components. If the existing elements on site do not meet the functional requirements and objectives of the new development, such as by impacting the expected longevity of the building, good practice measures will be adopted to maximise recovery of materials via reuse, reclamation or recycling. This will involve implementation of detailed demolition strategies, effective material segregation, appropriate storage and monitoring waste flows, as well as partnering with local organisations where feasible to direct elements for onward reuse, if unable to be incorporated on site.

7.12 Efforts will be made to maximise use of reused or recycled materials further by opting for materials with higher recycled content and reusing existing materials on site. Thus, best endeavours will be made to allow the scheme to align with GLA guidance of reusing/recycling at least 20% by value of material.

8. Whole Life Carbon Assessment Approach

8.1 At the “Reclaim and Recycle” option, Camden’s Energy Efficiency and Adaptation CPG (2021) requires a Whole Life Carbon Assessment to be conducted.

8.2 The purpose of this assessment is to provide a comparative analysis of the proposed scheme against the theoretical refurbishment of the existing building. It should be noted that refurbishment is not considered a viable option (as per the sections above), and the assessment of this scenario has been undertaken for comparison purposes only. Where methodology for assessments differs, details will be outlined in this report. However, to ensure a consistent approach for comparison, differences in methodology have been minimised where possible.

8.3 The Whole Life-Cycle Carbon Assessments were calculated using the One Click LCA software, utilising the GLA compliant & EN15804 +A2 data supported LCA calculation tools, along with the Carbon Designer 3D tool to help assess the theoretical refurbishment of the existing building.

8.4 Consideration has been given to the planning policy requirements, in particular Policy SI2 (*Minimising Greenhouse Gas Emissions*) of the London Plan; as well as the GLA’s Whole Life-Cycle Carbon Assessments guidance. The RICS Professional Statement - Whole Life Carbon Assessment for the Built Environment 1st Edition (RICS; ISBN 978 1 78321 208 8; November 2017); and BRE Global Methodology for the Environmental Assessment of Buildings Using EN 15978:2011 (Building Research Establishment; ref: PN 326 Rev 0.0; January 2018) have also been considered.

8.5 For the assessment of the proposed scheme, the quantity of building materials was determined using the ‘Elemental Cost Plan’ (July 2023), produced by PSP Consultants, which was available at the time of writing. The cost plan provided breakdowns of the various building elements and was the latest data available at the time of the assessment, representing an accurate estimation of material quantities required for the development relative to the current stage. Whilst it is acknowledged that a slightly revised cost plan has since been developed, the changes are not expected to be significant in regards to the modelling undertaken or affect the conclusions thereafter.

8.6 As refurbishment of the existing building is not proposed, there were limited resources available to estimate the quantity of building elements or the extent of works that would be required. Therefore, the Carbon Designer 3D tool in the One Click LCA software, supported by drawings of the existing building, were utilised to provide an estimate of material quantities. Whilst there are limitations to the tool as it is typically used in the early stage of design assessment, given the limited information available, it was considered the most appropriate estimate for the quantities of building materials.

8.7 The Gross Internal Area (GIA) and the number of storeys of the existing building were entered into the One Click LCA Carbon Designer 3D software to generate quantity estimates for key building components under the refurbishment scenario. Data from Carbon Designer 3D was subsequently imported into the GLA and RICS-compliant Carbon Assessment tool within One Click LCA. Assumptions regarding the construction of building elements were based on the location and age of the existing building. Since refurbishment is not proposed, assumptions were also necessary regarding the extent of any theoretical refurbishment. For calculation purposes, it was assumed that the majority of the building would be retained, with elements such as internal partitions, finishes, and some fixtures being updated.

8.8 The following table summarises the data sources for the assessments undertaken for the proposed scheme and refurbishment of the existing building respectively.

Table 5.1 WLC Primary Data Sources Summary

Lifecycle Stage		Data Source	
		Proposed Scheme	**Refurbishment (Theoretical)**
Product Stage	A1: Raw Material Supply	Elemental Cost Plan (July 2023) PSP Consultants	Carbon 3D Designer
	A2: Transport	One Click LCA database	One Click LCA database
	A3: Manufacturing	One Click LCA database	One Click LCA database
Construction Process Stage	A4: Transport to Building Site	One Click LCA database	One Click LCA database
	A5: Installation into Building	One Click LCA database	One Click LCA database
Use Stage	B1: Use / Application	One Click LCA database	One Click LCA database
	B2: Maintenance	One Click LCA – aligning to GLA assumption	One Click LCA – aligning to GLA assumption
	B3: Repair	One Click LCA – aligning to GLA assumption	One Click LCA – aligning to GLA assumption
	B4: Replacement	One Click LCA – aligning to RICS replacement cycles	One Click LCA – aligning to RICS replacement cycles
	B5: Refurbishment	One Click LCA database	One Click LCA database
	B6: Operational Energy Use	Sustainability & Energy Statement (October 2024) Ensphere Group	Energy Performance Certificate (EPC)

	B7: Operational Water Use	London Plan Policy	London Plan Policy
End of Life Stage	C1: Deconstruction / Demolition	One Click LCA database	One Click LCA database
	C2: Transport	One Click LCA database	One Click LCA database
	C3: Waste Processing	One Click LCA database	One Click LCA database
	C4: Disposal	One Click LCA database	One Click LCA database
Benefits & Loads Beyond the System Boundary	D: Reuse / Recovery / Recycling	One Click LCA database	One Click LCA database

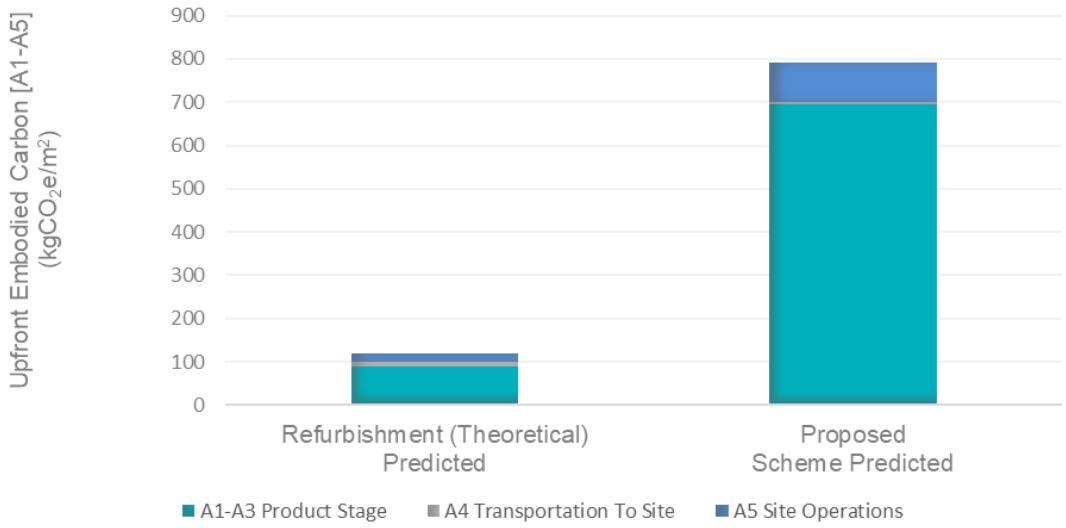
9. Whole Life Carbon Assessment Comparison

9.1 In line with Camden's Energy Efficiency and Adaptation CPG (2021) guidance, a high-level assessment of whole life carbon emissions has been undertaken.

9.2 RICS 'Whole life carbon assessment for the built environment' (2017) professional standard defines embodied carbon over the life cycle (LC-CO_2e) as comprising stages [A1–A5], [B1–B5] & [C1–C4]. This definition has been used for the purposes of this analysis, even though it is noted that the construction stages [module A] would sit with the existing building and therefore lie outside of the scope of the refurbishment scenario where materials are reused.

Upfront Embodied Carbon [A1-A5]

Figure 9.1 Proposed Scheme vs Refurbishment Upfront Embodied Carbon [A1-A5] Emissions ($kgCO_2e/m^2$)



Product Stage [A1-A3]

9.3 The product stage deals /with the carbon emissions attributable to the cradle to gate processes; raw materials supply, transport, and manufacturing; and comprise:

- Raw Material Extraction & Supply [A1]
- Transport to Manufacturing Plant [A2]
- Manufacturing & Fabrication [A3]

9.4 The processes covered by [A1–A3] frequently occur in several steps, where components are manufactured and then transported to a further fabrication plant for assembly into a system; and all of these interim steps need to be taken into account.

9.5 The calculation for the carbon emissions associated with the product stage [A1-A3] requires the assignment of suitable embodied carbon factors to the given elemental material quantities, as follows:

[A1-A3] = Material quantity (a) x Material embodied carbon factor (b)

9.6 Given the early stage of assessment for the proposed scheme, technical specification is still indicative, therefore generic data, representative of standard, market average specifications have been used where no specific material details are available. Environmental information for the product stage is defined in the product Environmental Product Declaration (EPD).

9.7 The following table summarises the building materials assumptions:

Table 9.1 Building Materials – Proposed Scheme

RICS Category	One Click LCA Resource	Quantity
1.1.1 Standard Foundations	Bitumen thick coating, for external basement walls and foundations, Dry layer 3-4 mm, 700 kg/m3, Pecimor 2K (PCI Augsburg)	322 m^2
	Precast concrete wall elements (solid, uninsulated), generic, C40/50 (5800/7300 PSI), 20% recycled binders in cement (400 kg/m3 / 24.97 lbs/ft3), incl. reinforcement	165 m^2
	EPS Insulation, L= 0.031 W/mK, R= 1 m2K/W, 600x1200x31 mm, 16 kg/m3, pressure class 80 kN/m² (EPS-gruppen)	133 m^2
	Self-levelling mortar (SLM), 2107.7 kg/m3, 3.01 Mpa, additive: polyfunctional plasticizer (One Click LCA)	2.66 m^3
	Damp insulation PE, 0.2 kg/m2, EN15804+A1, ref. year 2018	133 m^2
	Geogrid from polypropylene (PP) and geotextile, 367 g/m2, 4x50 m rolls, TriAx TX 150-GD (Tensar International)	322 m^2
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA)	133 m^2
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA)	69.99 m^3
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615	3591 kg
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615	7771.5 kg
	Stone wool insulation panels, L=0.037 W/mK, R=2.63 m2k/W, 100 mm, 3.3 kg/m2, 33 kg/m3, Lambda=0.037 W/(m.K), FLEXI 1200x600x100 (ROCKWOOL, UK plant)	157 m^2
	Stone wool insulation panels, L=0.037 W/mK, R=2.63 m2k/W, 100 mm, 3.3 kg/m2, 33 kg/m3, Lambda=0.037 W/(m.K), FLEXI 1200x600x100 (ROCKWOOL, UK plant)	165 m^2
2.1.1 Steel Frames	Structural steel profiles, generic, 60% recycled content, I, H, U, L, and T sections, S235, S275 and S355	198,00 kg
	Purlins and framing from cold rolled steel, Metsec Decarb (Voestalpine)	67667 kg

2.2.1 Floors	Gypsum plasterboard, fire resistant, 15.4x900/1200 mm, 12.7 kg/m2, PROTECT F, GFE/GF15 (Gyproc (2020))	93 m^2
	Stone wool insulation panels, L=0.037 W/mK, R=2.63 m2k/W, 100 mm, 3.3 kg/m2, 33 kg/m3, Lambda=0.037 W/(m.K), FLEXI 1200x600x100 (ROCKWOOL, UK plant)	363 m^2
2.3.1 Roof Structure	Extruded aluminium profiles for window and door frames, generic, 20% recycled content, average world aluminium manufacturing technology (One Click LCA)	451.49 kg
	Bitumen sheets, 5.0 kg/m2, EN15804+A1, ref. year 2018	56 kg
	Bituminous waterproofing system - Single layer, 5.44 kg/m2, AXTER, DERBIGUM, MEPLE, SIPLAST-ICOPAL, SOPREMA (Chambre Syndicale Française de l'Etanchéité)	8 m^2
	Precast concrete slabs, solid, ép. entre 20 et 30 cm, Dalle en béton plein armé (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	8 m^2
	Precast concrete wall elements (solid, uninsulated), generic, C40/50 (5800/7300 PSI), 20% recycled binders in cement (400 kg/m3 / 24.97 lbs/ft3), incl. reinforcement	6 m^2
	Drainage floor underlay from EPS, ép.25 mm, Couche drainante en polystyrène expansé (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	8 m^2
	Fibre cement facade panel, 10 mm, 13 kg/m2, 1300.0 kg/m3, EN15804+A1, ref. year 2018	677.24 kg
	Fibre cement facade panel, 10 mm, 13 kg/m2, 1300.0 kg/m3, EN15804+A1, ref. year 2018	56.45 m^2
	Glass wool thermal and acoustic insulation for roofs, R=5 m2K/W, Isolant thermique et acoustique pour combles en laine de verre [R=5 m².K/W] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	8 m^2
	Hot-dip galvanized steel sheets, recommended sheet steel thickness range: 0.4-3.0 mm (0.015-0.12 in), zinc coating: 20 µm (787.4 µin) (0.28kg/m2 / 0.057 lbs/ft2 sheet steel)	65.1 kg
	Weber floor smoothing screed, 5-50mm layer thickness, 34 kg/m2, vetonit 130 Core (weber.)	363 m^2
	Concrete roof tiles, Avg. thickness per m2: 22.4 mm, 334x420 mm, 2100 kg/m3 (Eternit)	93 m^2
	Aluminium profiles glass railings, 1.0 x 1.0 m, 20.71 kg/m2, Les fabricants pouvant utiliser les FDES collectives UDM-FFB sont les membres de l Union des Métalliers, les fabricants membres de la section garde-corps du SNFA ainsi que les entreprises qui fabriquent à partir de systèmes commercialisés par les concepteurs gammistes membres du SNFA.	28 m^2
	Dried lumber from spruce or pine wood, 474 kg/m3, moisture content 18 % (Puutuoteteollisuus)	69.75 m^2
	Dried lumber from spruce or pine wood, 474 kg/m3, moisture content 18 % (Puutuoteteollisuus)	4.65 m^2
	Dried lumber from spruce or pine wood, 474 kg/m3, moisture content 18 % (Puutuoteteollisuus)	90.75 m^2
	Softwood timber, kiln-dried, dressed, 551 kg/m3, 12% moisture content, W = 35 - 90 mm, D = 42 - 290 mm (Carter Holt Harvey Woodproducts Australia, Hyne Timber, TASCO trading as Dongwha Timbers Pty Ltd, Timberlink Australia, Wespine Industries Pty Ltd (2017))	2.64 m^3

	Wooden decking, cladding and planed timber for joinery applications, 540kg/m3, Moistr. 3-5%, Accoya Scots Pine (Accsys Technologies PLC)	66 m^2
	Planed timber, conifer (Treindustrien)	90.75 m^2
	Plastic vapour control layer, 0.2 mm (Tommen Gram)	93 m^2
	Geotextile, generic, 312 g/m2 (1.02 oz/ft2), Composition: PP net, non-woven PE felt	93 m^2
	Draining roof terrace, 4.525 kg/m2 (ICOPAL)	281 m^2
	Polypropylene vapour membrane, French average, 0.18 kg/m2 (MDEGD)	8 m^2
	Polyethylene sealing film for slabs, ép. 150 micron, Donnee par default (MDEGD)	8 m^2
	Plywood, generic, 4-50 mm (0.16-1.97 in), 620 kg/m3 (38.7 lbs/ft3)	93 m^2
	Plywood, generic, 4-50 mm (0.16-1.97 in), 620 kg/m3 (38.7 lbs/ft3)	363 m^2
	Soil substrates for green roofs (MDEGD)	0 kg
	Waterproof, protective, flexible coating, 1.5 kg/l, Lastogum (PCI Augsburg)	93 m^2
	Gypsum plasterboard, fire resistant, 15.4x900/1200 mm, 12.7 kg/m2, PROTECT F, GFE/GF15 (Gyproc (2020))	363 m^2
	Stone wool insulation panels, unfaced, generic, L = 0.035 W/mK, R = 2.89 m2K/W (16 ft2°Fh/BTU), 50 kg/m3 (3.12 lbs/ft3) (applicable for densities: 25-50 kg/m3 (1.56-3.12 lbs/ft3)), Lambda=0.0346 W/(m.K)	93 m^2
	Stone wool insulation panels, unfaced, generic, L = 0.035 W/mK, R = 2.89 m2K/W (16 ft2°Fh/BTU), 50 kg/m3 (3.12 lbs/ft3) (applicable for densities: 25-50 kg/m3 (1.56-3.12 lbs/ft3)), Lambda=0.0346 W/(m.K)	93 m^2
	Stone wool insulation panels, unfaced, generic, L = 0.035 W/mK, R = 2.89 m2K/W (16 ft2°Fh/BTU), 50 kg/m3 (3.12 lbs/ft3) (applicable for densities: 25-50 kg/m3 (1.56-3.12 lbs/ft3)), Lambda=0.0346 W/(m.K)	363 m^2
	Stone wool insulation panels, unfaced, generic, L = 0.035 W/mK, R = 2.89 m2K/W (16 ft2°Fh/BTU), 50 kg/m3 (3.12 lbs/ft3) (applicable for densities: 25-50 kg/m3 (1.56-3.12 lbs/ft3)), Lambda=0.0346 W/(m.K)	272.25 m^2
	Stone wool insulation panels, unfaced, generic, L = 0.037 W/mK, R = 2.70 m2K/W (15 ft2°Fh/BTU), 150 kg/m3 (9.36 lbs/ft3) (applicable for densities: 100-150 kg/m3 (6.24-9.36 lbs/ft3)), Lambda=0.037 W/(m.K)	93 m^2
	Geotextile from polypropylene, 300 g/m2 (MDEGD)	8 m^2
	Reinforcement mesh fabric (glass fibre), 0.16kg/m2, R131 (ADFORS)	381.15 m^2
2.4.1 Stair and Ramp Structures	Communication cable, 0.231 kg/m, Câble PTT 288 [14 paires] - DONNEE ENVIRONNEMENTALE PAR DEFAUT (MINISTERE DE L'ENVIRONNEMENT, DE L'ENERGIE ET DE LA MER - MINISTERE DU LOGEMENT ET DE L´HABITAT DURABLE)	1.68 m
	Galvanized steel water supply plumbing, French average, DN=110mm, Réseau d'adduction d'eau en acier galvanisé (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	1.41 m
	Thermostatic unit for controlling the mixing of hot and cold water, 2.39 kg/unit, 10720000 AX Starck thermostat 18357000 A X thermostatic module Select 13151000 HG ShowerTablet Select 300 bath thermostat 10751000 AX ShowerSolutions thermostatic module 34705000 AX Citterio M thermostat 13151400 HG ShowerTablet Select 300 bath thermostat 10751001 AX ShowerSolutions thermostatic module USA 34725000 AX Citterio M thermostat 13151407 HG ShowerTablet Select 300 bath thermostat CN 14731000 HG Sanibel 5001 thermostat 36703000 AX Citterio E thermostatic module 13154000 HG MyFox bath thermostat (HANSGROHE SE)	6 unit

	Fire sprinkler, 0.072 kg/unit, Sprinkler pendant (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	0.42 unit
	Aluminium profiles glass railings, 1.0 x 1.0 m, 20.71 kg/m2, Les fabricants pouvant utiliser les FDES collectives UDM-FFB sont les membres de l Union des Métalliers, les fabricants membres de la section garde-corps du SNFA ainsi que les entreprises qui fabriquent à partir de systèmes commercialisés par les concepteurs gammistes membres du SNFA.	21 m^2
	Aluminium tubes railings, 1.0 x 1.0 m, 7.62 kg/m2, Les fabricants pouvant utiliser les FDES collectives UDM-FFB sont les membres de l Union des Métalliers, les fabricants membres de la section garde-corps du SNFA ainsi que les entreprises qui fabriquent à partir de systèmes commercialisés par les concepteurs gammistes membres du SNFA…	42 m^2
	One storey timber staircase, 2587x225x905 mm, 41.9 deg (Stair Craft)	1 unit
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615	1071.31 kg
	Reinforcement steel (rebar), generic, 97% recycled content (typical), A615	3087.75 kg
2.5.1 External Enclosing Walls Above Ground Level	Lightweight concrete block, with expanded clay aggregate, generic, 650 kg/m3 (40.6 lbs/ft3), 18 kg/block (39.7 lbs/block), 0.5x0.3x0.185 mm (0.019x0.012x0.007 in)	719.91 m^2
	Red brick, average production, UK, 215 mm x 102.5 mm x 65 mm, 2.13 kg/unit, 1485 kg/m3 (Brick Development Association (BDA) Ltd (2019))	638.1 m^2
	Gypsum plaster, 1100 kg/m3 (Bundesverband der Gipsindustrie)	761 m^2
	Masonry mortar/facing wall mortar/mortar with special properties, 1500 kg/m3, EPD coverage: >1500 kg/m3 (IWM)	122.9 m^2
	Masonry mortar/facing wall mortar/mortar with special properties, 1500 kg/m3, EPD coverage: >1500 kg/m3 (IWM)	41.09 m^2
	Flexible tile adhesivefor ceramic coverings, 2.2 kg/m2, 2.4 kg/m2, 1200 kg/m3, 1400 kg/m3, Flexmörtel® S1 Rapid, Flexmörtel® S2 Rapid (PCI Augsburg GmbH)	761 m^2
	Flexible tile adhesivefor ceramic coverings, 2.2 kg/m2, 2.4 kg/m2, 1200 kg/m3, 1400 kg/m3, Flexmörtel® S1 Rapid, Flexmörtel® S2 Rapid (PCI Augsburg GmbH)	761 m^2
	Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	761 m^2
	Stone wool insulation panels, unfaced, generic, L = 0.037 W/mK, R = 2.70 m2K/W (15 ft2°Fh/BTU), 150 kg/m3 (9.36 lbs/ft3) (applicable for densities: 100-150 kg/m3 (6.24-9.36 lbs/ft3)), Lambda=0.037 W/(m.K)	761 m^2
2.5 External Walls	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA)	10.71 m^3
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA)	30.88 m^3
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA)	1707 kg
	Ready-mix concrete, normal strength, generic, C32/40 (4600/5800 PSI) with CEM II/B-V, 20% fly ash content in cement (300 kg/m3; 18.7 lbs/ft3 total cement) (One Click LCA)	53 kg

	Gypsum plasterboard, L= 0.19 W/mK, R = 0.05 m2K/W, 9.5 mm, 6.1 kg/m2, 642 kg/m3, Lambda=0.19 W/(m.K), Baseboard (Knauf UK GmbH)	761 m^2
2.6.1 External Windows	Aluminium frame window double-glazed, operable(tilt and turn), 50% recycled aluminium, 1.48 m x 2.18 m, 25.3 kg/m2 (One Click LCA)	97 m^2
2.6.2 External Doors	Aluminium entrance door, 26.5 kg/m2 (One Click LCA)	4.2 m^2
	Balcony door, 38.58 kg/m2 (TMP Fenster and Turen® GmbH)	16.8 m^2
	External wood door, 2,1 x 1 m	3 unit
2.7.1 Walls and Partitions	Perforated light weight aggregate concrete block, 200 x 250 x 500 mm, 770 kg/m3, Leca Universalblokk (Weber)	342 m^2
	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)	343 m^2
	Finishing wall mortars, French average, 3 mm, 4.2 kg/m2, Mortiers de ragréage muraux (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	342 m^2
	Finishing wall mortars, French average, 3 mm, 4.2 kg/m2, Mortiers de ragréage muraux (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	342 m^2
	Masonry mortar, light, 1000 kg/m3 (quick-mix)	5130 kg
	Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	343 m^2
	Gypsum plaster board, regular, generic, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	343 m^2
	Structural steel profiles, generic, 60% recycled content, I, H, U, L, and T sections, S235, S275 and S355	949.08 kg
2.8 Internal Doors	Doors with wooden frame, interior, Portes intérieures de communication avec huisserie bois (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	70 m^2
3.2 Floor Finishes	Broadloom carpet with nylon 6.6 pile material, 2.43 kg/m2, maximum surface pile weight 1000 g/m2 (One Click LCA)	124 m^2
	Broadloom carpet with nylon 6.6 pile material, 2.43 kg/m2, maximum surface pile weight 1000 g/m2 (One Click LCA)	25 m^2
	Carpet tile, 0.23-0.28 in (5.85-7.15 mm), 0.5 x 0.5 m, 4.12 kg/m2, Inline (Forbo Flooring B.V.)	48 m^2
	Carpet tile, 0.23-0.28 in (5.85-7.15 mm), 0.5 x 0.5 m, 4.12 kg/m2, Inline (Forbo Flooring B.V.)	15 m^2
	Concrete blocks with paint finish, 7.3 MPa, 100-140 mm, 141.6 kg/m2, Synerg Eco (Plasmor Limited)	19 m^2
	Moulded torus/ogee shaped profile from medium density fiberboard (MDF), 4.4x144x18 mm, 1.944 kg/m, Skirting Torus/Ogee Profile (Staircraft Group Ltd)	725 m
	Moulded torus/ogee shaped profile from medium density fiberboard (MDF), 4.4x144x18 mm, 1.944 kg/m, Skirting Torus/Ogee Profile (Staircraft Group Ltd)	118 m
	Partitioning wall system (internal insulated wall) with: steel studs, glass wool core and gypsum board double siding, 45mm (laine	458 m^2

	de verre)+2x13mm(Placoplatre), 1.1 K.m2/W, Placostil® 72/48 Placoplatre® BA13 – 2,5m (PLACOPLATRE)	
	Partitioning wall system (internal insulated wall) with: steel studs, glass wool core and gypsum board double siding, 45mm (laine de verre)+2x13mm(Placoplatre), 1.1 K.m2/W, Placostil® 72/48 Placoplatre® BA13 – 2,5m (PLACOPLATRE)	67 m^2
	Solidwood flooring, multiple species, thickness range: 8 - 22mm, 4.38kg/m2, 548 kg/m3 oven-dry, moisture content < 13% (One Click LCA)	287 m^2
	Woven polypropylene geotextile, 0.11 kg/m2 (One Click LCA)	47 m^2
	Ceramic wall tile, 6 mm, average density 2000 kg/m3 (Mosa)	47 m^2
3.3 Ceiling Finishes	Lightweight ready-mix jointing plaster for plasterboards, 0.35 kg/m2, Gyproc® Gyp finisher (Saint-Gobain Placoplatre)	525 m^2
	Acrylic water-based decorative emulsions for interior wall or ceiling surface, 0.1184 kg/m2, Flat Matt XD (COAT paints)	525 m^2
	Suspended plasterboard ceiling, 6.5 mm, Plafond suspendu en plaque de plâtre [ép. 6,5mm] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	478 m^2
	Gypsum plasterboard, fire/moisture/impact resistant, 15 mm, 15 kg/m2, LaDura (Etex Building Performance Limited)	47 m^2
3. Internal Finishes	Cement plaster, grey, bulk density 1.1 kg/dm3, fresh mortar 1.4 kg/dm3, 2-100 mm, Ardex A 950 (Ardex)	685 m^2
	Acrylic water-based decorative emulsions, 0.1196 kg/m2, Eggshell XD (COAT paints)	1370 m^2
	Gypsum plaster board, regular, 50% recycled gypsum, 6.5-25 mm (0.25-0.98 in), 10.725 kg/m2 (2.20 lbs/ft2) (for 12.5 mm/0.49 in), 858 kg/m3 (53.6 lbs/ft3)	685 m^2
	Ceramic wall tile, 6 mm, average density 2000 kg/m3 (Mosa)	264 m^2
4. Finishes, furnishings and equipment	Bathroom vanity unit, biogenic CO2 not subtracted (for CML), 17.55 kg/unit, Meuble à vasque salle de bain (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	6 unit
	Wardrobe from medium density particleboard, H: 2323 mm, D: 606 mm, W: 2670 mm, 288 kg/unit (One Click LCA)	6 unit
5.1 Sanitary Installations	Ceramic toilet set, 26.93 kg/unit (Ideal Standard International)	12 unit
	Ceramic bathroom washbasin, 16.7 kg/unit, 850 × 460 × 150 mm (One Click LCA)	12 unit
	Enamelled steel bathtub, French average, Long. 170 cm Larg. 70 cm Haut. 40 cm, Baignoire en acier émaillé (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	6 unit
	Semi-frameless shower enclosure, 50 kg/unit, 875 x 875 x 1950 mm, tempered glass thickness: 6 mm, 70% recycled aluminium frame (One Click LCA)	4 unit
5.10 Lift and Conveyor Installations	Passenger elevator car , electrical controls, counter weight, drive and motor of traction (cable) type, 630 kg (8 persons) load capacity, 1.0 m/s speed, 1587.7 kg/unit (USE ONLY WITH Elevator hoistway) (One Click LCA)	1 unit
5.4 Water Installations	Hand shower, brass, 1.01 kg/unit (IDEAL STANDARD FRANCE)	6 unit
	Cast iron pipes and fittings, for sewer and rainwater use, 7.41 kg/m, Ensemble des gammes de tuyaux - raccords - accessoires SMU S et SME (SAINT-GOBAIN PAM - CANALISATION BÂTIMENT)	120 kg
	Drinking water supply piping network, per m2 GIFA (residential buildings)	652 m^2

	Sewage water drainage piping network, per m2 GIFA (residential buildings)	652 m^2
	Domestic drinking water supply system (heating, cooling, purification), 26.18 kg/unit, HydroTap BC 160/125 (Zip Water (United Kingdom) (2022))	12 unit
	Flow meter with bendable plate, 0.93kg, Contrôleur de débit à palette (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	0.013 unit
5.6 Space Heating and Airconditioning	Butterfly valve, fire suppressing, Diam.=100mm, Cartouche coupe feu ou pare-flamme (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	0.034 unit
	Smoke extraction unit, 170 kg/unit, flow rate: 5000-10000 m3/h, Caisson de désenfumage [débit entre 5000 et 10000m3/h] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	1 unit
	Air handling unit, with heat recovery through plate heat exchanger, 10 000 m3/h (5885.8 ft3/min), 1256 kg/unit (2769 lbs/unit)	0.17 unit
	Ventilation ducting, per m linear, D: 63 mm (2.48 in)	214.51 m
	Electricity distribution system, cabling and central, for all building types, per m2 GFA	652 m^2
5.7 Ventilation Systems	Mechanical ventilation with heat recovery, 3.5/5 l/s at 100%, 55 kg/unit, LGH-50RVS-E (Mitsubishi Electric)	6 unit
5.8.3 Lighting Installations	Indicator lights, P=0.035W, 0.002 kg/unit, Voyants de signalisation [Puissance = 0,035W] (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	2.15 unit
	Fluorescent lamp, T8-18W, 0.07 kg/unit, EN15804+A1, ref. year 2018	355.7 kg
5.8 Electrical Installations	Two-way TV/satellite splitter, 0.129 kg/unit, TN231 (HAGER / HAGER SE)	6 unit
	Smoke detector, French average, Détecteurs de fumée (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	6 unit
	Smoke detector, French average, Détecteurs de fumée (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	12.44 unit
	Security alarm center, French average, Centrales d'alarme (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	1 unit
	Output device, 0.382 kg/unit, TYA606E TYA606E (Hager SE)	0.23 unit
	Electrical junction box, French average, Boîte de dérivation (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	0.096 unit
	Energy Efficient EX Transformers (Copper), EX75T3H, DOE 2016 (SCHNEIDER ELECTRIC INDUSTRIES SAS)	190.55 kg
	Battery Lithium ion, French average, capacité=200Ah, Batterie Lithium ion (DONNEE ENVIRONNEMENTALE GENERIQUE PAR DEFAUT)	226.85 kg
	Junction box, 0.154 kg/unit, IP55 100x100 (B05534), B05534, B05546 (Hager SE)	18.33 kg
	Cable 1-wire, 0.02 kg/m, EN15804+A1, ref. year 2018	92.1kg
	Insulated switchgear, 422.165 kg/unit, SM6-36 IM (SCHNEIDER ELECTRIC INDUSTRIES SAS)	14.2 kg
5. Services	Communication cable, 0.231 kg/m, Câble PTT 288 [14 paires] - DONNEE ENVIRONNEMENTALE PAR DEFAUT (MINISTERE DE L'ENVIRONNEMENT, DE L'ENERGIE ET DE LA MER - MINISTERE DU LOGEMENT ET DE L´HABITAT DURABLE)	57.59 m
	Communication cable, 0.231 kg/m, Câble PTT 288 [14 paires] - DONNEE ENVIRONNEMENTALE PAR DEFAUT (MINISTERE DE L'ENVIRONNEMENT, DE L'ENERGIE ET DE LA MER - MINISTERE DU LOGEMENT ET DE L´HABITAT DURABLE)	161.1 kg

	Non-reversible air/water heat pump for heating and hot water production, monosplit (1 exterior, 1 interior unit), P=6 kW, 155 kg/unit (One Click LCA)	6 unit
8.2.1 Roads, Paths, and Pavings	Hot dip galvanized steel, 0.73 mm, 5.72 kg/m2, EN15804+A1, ref. year 2018	12820 kg
	Shed for bicycle parking, charging stations, 1156.52 kg/unit, City 90 Piazza bike rack (2 modules) (Norfax AS)	2 unit
	Steel frame urban bike stand, 8.50 kg/unit (Norfax AS)	11 unit
	Concrete flags, blocks and kerbs, 200x100x60mm, 134.9 kg/m2, Omega 200x100x60mm (Brett Landscaping and Building Products, Barrow plant)	24 m^2
	Geocellular system for sub-base drainage, Permavoid 150 (PVPP150) (Polypipe Civils & Green Urbanisation)	12 unit
	Permeable and natural pavemant for light vehicle traffic, 60.4 kg/m2, URBALITH (COLAS)	22 m^2

Transport Emissions [A4]

9.8 Transport emissions must include all stages of the journey of the products following their departure from the final manufacturing plant to the project site, taking into account any interim stops at storage depots / and / or distribution centres.

9.9 Transport emissions are calculated as follows:

[A4] = Material or system mass (a) x Transport distance (b) x Carbon conversion factor (c)

9.10 For the purposes of this WLC assessment, the One Click LCA library dataset has been used.

Construction – Installation Process Emissions [A5]

9.11 The carbon emissions arising from any on- or off-site construction-related activities must be considered in [A5]. This includes any energy consumption for site accommodation, plant use and the impacts associated with any waste generated through the construction process, its treatment and disposal.

9.12 The RICS PS permits the use of an average figure of 1,400kgCO_2e/£100K of project value for building construction site emissions, in the absence of more specific information. This figure is taken from the BRE SMARTWaste KPIs and is based on the date of the publication, March 2015; and should therefore be adjusted to current value in accordance with CPI.

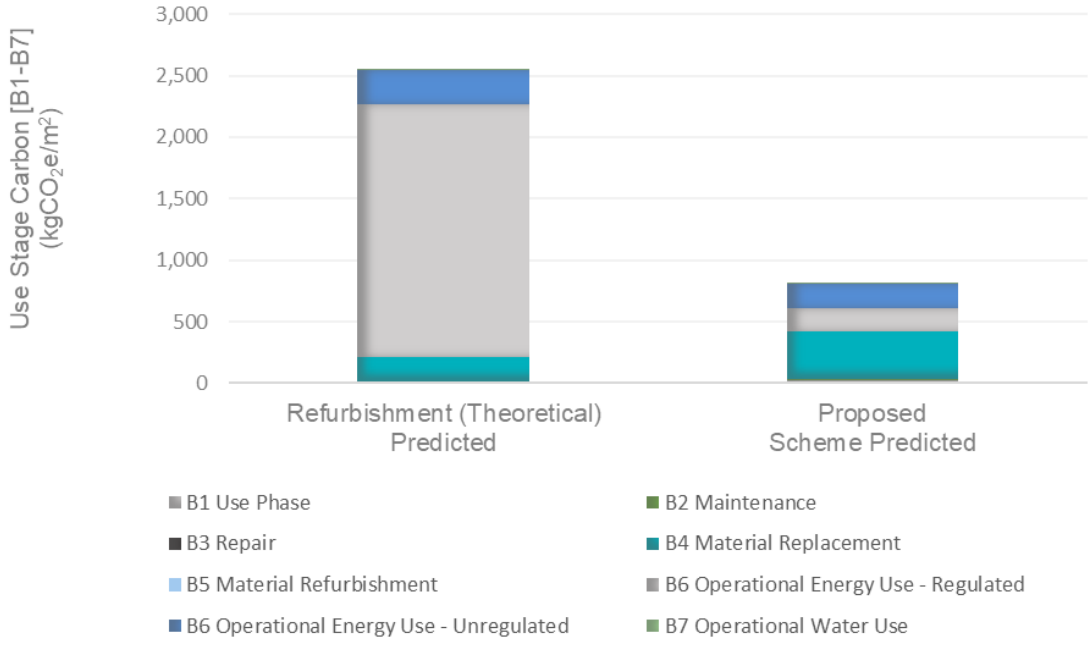
9.13 This approach is used within One Click LCA whereby the cost figure is based on the date of the publication of the above RICS Guidance, March 2015, and is adjusted to current value in accordance with CPI (Dec 2022).

Use Stage [B1-B7]

9.14 The use stage captures the carbon emissions associated with the operation of the built asset over its entire life cycle, from practical completion to the end of its service life. This includes any emissions relating to operational energy and water use as well as any embodied carbon

impacts associated with maintenance, repair, replacement, and refurbishment of building components.

Figure 9.2 Proposed Scheme vs Refurbishment B1-B7 Use Stage Emissions ($kgCO_2e/m^2$)



Use [B1]

9.15 The in-use module [B1] captures the emissions arising during the life of a building from its components; including any emissions arising from refrigerants, insulation blowing agents and paints; as well as accounting for the carbonation process in items containing exposed concrete and / or lime.

9.16 For the proposed scheme, refrigerant leakage from the ASHPs were estimated using TM65 methodology as part of the emissions arising during the operation of the building. Assumptions regarding the type and number of ASHPs being installed as part of the development were applied. These were then used within the model to estimate the refrigerant charge. As refurbishment of the property is not proposed, it is unknown whether refrigerants would be utilised as it would be dependent on the extent of works. For the purposes of the assessment, it was assumed that no refrigerants would be present.

9.17 Cementitious materials, such as concrete, cement and mortar, absorb carbon dioxide when exposed to air. This process is the chemical reversal of the cement production process calcination phase. The amount of carbon dioxide absorbed depends on exposure of the material, duration of the exposure as well as the initial amount of cement. The figures associated with the carbonisation have not been generated through the OneClick LCA software.

Carbon absorption potential by green roofs and facades should also be considered, although the absorption potential for areas <1,000m^2 is generally considered negligible. It should be noted that removals associated with vegetation are not persistent and will be lost unless the project is set up in such a way to preserve vegetation at its eventual demolition. Vegetation carbon withdrawals have therefore not been modelled.

Maintenance [B2]

9.18 The [B2] module accounts for the carbon emissions arising from any activities relating to the maintenance processes, including cleaning, and any products used. It also includes any emissions from the energy and water use associated with these activities.

9.19 Emissions associated with maintenance are not calculated by the One Click LCA software on the basis that there are no meaningful data sources. Alternatively, the GLA suggests that for module B2 emissions, a total figure of 10 kgCO_2e/m^2 gross internal area (GIA) may be used to cover all building element categories, or 1 per cent of modules A1-A5, whichever is greater. This approach has been adopted to estimate emissions from maintenance.

Repair [B3]

9.20 Module [B3] is intended to take account of the carbon emissions arising from all activities that relate to repair processes and any products used. Typically, this would require data from facilities management / maintenance strategy reports, façade access and maintenance strategy, life cycle cost reports, O&M manuals, and professional guidance.

9.21 As per the B2 module, given the lack of accurate data at this stage for repair scenarios, the RICS methodology has been used which assumes UK repair impacts are equivalent to circa 25% of B2 maintenance impacts.

Material replacement and refurbishment [B4-B5]

9.22 Carbon emissions associated with the anticipated replacement of building components, including any emissions from the replacement process are captured under module [B4]. All emissions arising from the production, transportation to site and installation of the replacement items must be included. This extends to cover any losses during these processes as well as the carbon associated with component removal and end of life treatment.

9.23 Module [B5] must take into account any carbon emissions associated with any building components used in a refurbishment, including any emissions from refurbishment activities. All emissions arising from the production, transport to site and installation of the components used must be included. This includes any losses during these processes, as well as the carbon associated with their removal and end of life treatment.

9.24 The calculation of refurbishment should account for any material additions and variations, instead of like-for-like as in replacement. It is assumed that items are being replaced on a like-

for-like basis and full replacement (100%) of the items is assumed once the specified lifespan is reached.

9.25 Details for service life are automatically entered into the One Click LCA software for each of the selected building materials since it is typically quantified in the product's EPD. These service life timeframes have been amended in line with the RICS PS indicative component lifespans for the UK, where different, in the absence of more specific data. These emissions are accounted for in the B4 part of the lifecycle. As no refurbishment is planned for the building, it has been assumed that no change of use will occur during the service life of the project.

Operational Energy Use [B6]

9.26 The operational carbon emissions arising from the energy use of building-integrated systems as projected and/or measured throughout the life cycle of the project must be reported under module [B6].

9.27 For the proposed scheme, a Sustainability & Energy Statement conducted by Ensphere Group Ltd estimated an overall energy demand for development to be 30,882 kWh/yr, using the SAP 10.2 carbon conversion factors. This is broken down into ~14,706 kWh/yr from regulated sources, ~16,176 kWh/yr from unregulated energy. This equates to ~252 tonnes over a 60-year time period.

9.28 Since refurbishment of the property is not proposed, potential operational energy use has not been assessed. Instead, the Energy Performance Certificate (EPC) for the existing building has been used as the most appropriate data source. The regulated operational energy use is estimated at 24,620 kWh, accounting for space and hot water heating based on the EPC. While this figure may underestimate actual usage, as other regulated energy demands like lighting and auxiliary use are not included, it is assumed that any shortfall would be offset by potential improvements to the building fabric or systems during refurbishment.

Table 9.2 Existing Estimated Energy Performance Certificate

Certificate number	Floor Area (m^2)	Energy Rating		Heating Requirements (kWh)	
		Current	Potential	Space Heating	Hot Water
8618-7623-0040-4999-8972	137	E - 45	C - 73	21,652	2,968

Operational Water Use [B7]

9.29 All carbon emissions related to water supply and wastewater treatment, over the life cycle of the building (excluding water use during maintenance, repair, replacement, and refurbishment that are reported elsewhere), must be reported under module [B7].

9.30 In line with the London Plan, the maximum daily total water demand was assumed to equal 105 litres / person / day for residential development. This should be understood as upper limits (i.e., worst case scenario) as the proposed reduced flow / flush systems should limit daily usage. Therefore, for the purposes of the assessments, this has been assumed based on expected occupancy of the schemes.

End of Life Stage [C1 to C4]

9.31 The EoL stage commences when the built asset has reached the end of its life and will no longer be used. For the purposes of the whole life carbon assessment this is assumed to occur at the end of the reference study period of the building. The reference study period is used for consistency and comparability of results, irrespective of other factors which might determine the lifespan of the building (e.g., lease period).

9.32 Any emissions arising from decommissioning, stripping out, disassembly, deconstruction and demolition operations as well as from transport, processing and disposal of materials at the end of life of the project must be accounted for in module [C], which is subdivided as follows:

- deconstruction and demolition emissions [C1]
- transport emissions [C2]
- waste processing for reuse, recovery or recycling emissions [C3]
- disposal emissions [C4]

9.33 The carbon emissions arising from any on or off-site deconstruction and demolition activities, including any energy consumption for site accommodation and plant use, must be considered in [C1]. According to the RICS PS, an average rate of 3.4 $kgCO_2e/m^2$ GIA (rate from monitored demolition case studies in central London) based on aggregated data should be used in the absence of more specific information.

9.34 Any carbon emissions associated with the transportation of deconstruction and demolition arisings to the appropriate disposal site, including any interim stations, must be captured within module [C2]. The transport emissions for the discarded items should be calculated based on the following formula:

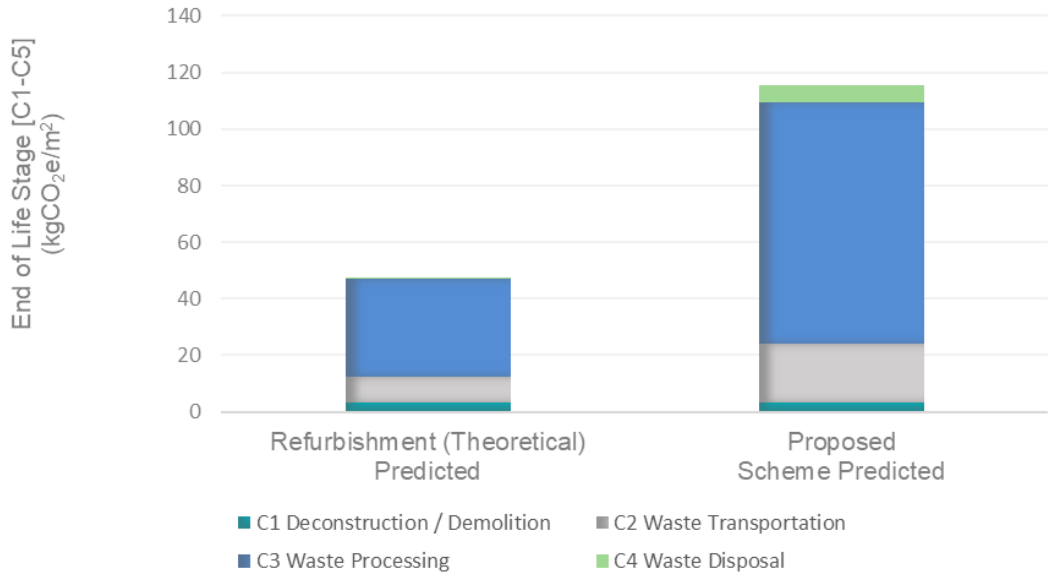
[C2] = Mass of waste to be transported (a) × Transport carbon factor (b) × Distance to disposal site (c)

9.35 When materials and/or components are intended to be recovered and reused or recycled after the end of the life of the built asset, any carbon emissions associated with their treatment and processing prior to reaching the end-of-waste state must be included in module [C3].

9.36 For elements not expected to be recovered and repurposed but intended for final disposal either in landfill or incineration, an allowance for the emissions arising from their disposal must be included in [C4].

9.37 Library data associated with the One Click LCA generates figures for the total C1-C4 emissions on the basis of the materials selected. The following has been calculated:

Figure 9.3 Proposed Scheme vs Refurbishment End of Life Stage Emissions [C1-C4] ($kgCO_2e/m^2$)



Benefits & Loads Beyond the System Boundary [D]

9.38 Module [D] covers any benefits or burdens accruing from the repurposing of elements discarded from the built asset, or any energy recovered from them beyond the project's life cycle. It is communicated separately as it occurs beyond the life cycle of the project under study and also bears high inherent uncertainty regarding the future treatment of building components. In the absence of more specific data, reliance is given to the data within the One Click LCA tool, as per the WLC Assessment approach for the revised proposals. Results for Module [D] are presented in the table showing WLC emission breakdown in the following section.

10. Whole Lifecycle Carbon Assessment Results

10.1 The following presents the proposed project breakdown of whole life carbon emissions.

Table 10.1 Whole Life Carbon Assessment ($kgCO_2e$)

	Biogenic Carbon	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6 - Regulated	B6 - Unregulated	B7	C1	C2	C3	C4	D (*)	TOTAL
0.1 Toxic Mat.																		
0.2 Demolition													2216.8					2216.8
0.3 Supports																		
0.4 Groundworks																		
0.5 Diversion																		
1 Substructure	-	56459.84	2289.25	2138.28			-							5794.64	2064.66	12.99	-12204.4	68759.67
2.1 Frame	-	125429.03	368.43	4199.39			-							1279.72	176.97		-43001.5	131453.5
2.2 Upper Floors	-	1730.34	8.04	191.14			-	818.04	-					51.2	0.54	138.92	-2.06	2938.21
2.3 Roof	-40852.65	33654.3	268.26	3651.73			-	25521.07	-					865.3	44014.63	822.17	-13028.1	67944.8
2.4 Stairs & Ramps	-219.57	8694.79	23.11	136.85			-	6621.34	-					74.24	229.87	46.31	-457.25	15606.95
2.5 Ext. Walls	-41.85	80389.02	1193.37	6931.88			-	36608.53	-					3749.29	130.14	939.52	-7440.72	129899.9
2.6 Windows & Ext. Doors	-258.5	10789.32	19.76	-			-	11010.72	-					49.02	400.01	11.11	-6766.75	22021.45
2.7. Int. Walls & Partitions	-	22769.78	159.09	2516.25			-	22152.91	-					773.36	23.09	459.23	-3998.45	48853.72

2.8 Int. Doors	-1668.33	891.8	4.53	-			-	928.69	-					13.31	1678.96	8.42	-412.04	1857.38
3 Finishes	-2320.51	13482.55	88.74	2083.56				31188.05	-					490.98	3679.33	1423.54	-1270.79	50116.25
4 Fittings, furnishings & equipments	-2990.68	1864.08	17.01	77.85				9731.38	-					26.82	3012.09	16.96	-2506.89	11755.5
5 Services (MEP)	-	41684.35	81.16	288.72	15246.21	278,139		53980.81	-	119999.98	132000	5745.3		127.4	11.99	0.26	-22952.9	369166.2
6 Prefabricated																		
7 Existing bldg																		
8 Ext. works	-	54865.72	89.71	2776.29				53124.82	-					290.14	112.48	0.26	-38918.3	111259.4
Other or overall site construction				32965.32														32965.32
Unclassified / Other							6520											8150
TOTAL kg CO2e	**-48352.1**	**452704.92**	**4610.46**	**57957.27**	**15246.21**	**278,139**	**6520**	**251686.3**	**-**	**119999.98**	**132000**	**5745.3**	**2216.8**	**13585.44**	**55534.76**	**3879.7**	**-152960**	**1074965**

(*) Module D is not included in totals

11. Recommendations

11.1 Since refurbishment is not considered viable and therefore is not proposed, the following comprises a series of recommendations to assist with further reducing the carbon emissions associated with the proposed development.

11.2 The Whole Life-Cycle Carbon Assessment for the proposed scheme has identified the following key areas as being the most significant contributors to emissions:

[A1-A3] Product Stage

11.3 These were assessed to represent ~452,705 $kgCO_2e$, equating to approximately 42% of the total. These emissions are largely associated with the material choices associated with the substructure, superstructure, and external works; where decisions are also influenced by factors such as structural performance, cost and aesthetics.

11.4 There may be scope to investigate alternatives with a lower carbon footprint; however, given the nature of the proposed development, the potential for significant reductions may be limited. Nevertheless, it is recommended that material options be revisited as the detail of the design development to review the potential extent of savings.

[B4-5] Material replacement and refurbishment

11.5 Material replacement and refurbishment emissions were assessed at ~251,686 $kgCO_2e$, approximately 23% of the total. These emissions are associated with the estimated lifespans associated with the selected materials and it may be feasible to identify more resilient materials products with longer lifespans.

[B6-7] Operational Energy Use

11.6 Operational energy use emissions were assessed at circa 120,000 $kgCO_2e$ (regulated) and 132,000 $kgCO_2e$ (unregulated); representing 23% of the total. Operational energy use is expected to contribute significantly to emissions over the buildings predicted lifetime, this figure may not however fully account for future grid decarbonisation in the UK over the next 60 years as it is based on current (SAP10.2) carbon conversion factors and will likely steadily reduce over time.

Offsetting

11.7 Acknowledging that it is not always feasible to completely eradicate WLC emissions through design decisions, consideration could be given to the potential for offsetting the impacts through abatement measures elsewhere and / or contributions to facilitate such abatements (e.g., green tariff electricity).

12. Circular Economy Narrative

12.1 This section describes the strategy for how the proposal's design and construction will reduce material demands and impact on the environment.

Conserve Resources, Increase Efficiency and Source Sustainably

12.2 As part of the efforts to conserve resources, the design will be reviewed throughout the design process to ensure that material quantifies are optimised. This will be particularly relevant in the context of the structural design whereby foundations and frame constitute a very significant part of the overall bill of materials.

12.3 There will be a need to consider (and potentially balance) other factors, such as embodied carbon targets, as these will also be driving the materials strategy.

12.4 In terms of the existing site, a pre-demolition audit will be undertaken to better understand the quantity and nature of available materials. These will be reused on site wherever feasible on the basis that it will reduce disposal costs and improve the circularity of the development proposals.

12.5 The conservation of resources through the operation of the building will be the responsibility of the end users, however, this will be encouraged through the provision of suitable educational information (e.g., Building User Guide).

Design to Eliminate Waste (and for Ease of Maintenance)

12.6 The elimination of waste will be an objective to be targeted through careful procurement (i.e., only procuring the necessary quantity of materials), and ensuring the selection of building elements that are demonstrably more robust and therefore requiring reduced maintenance, repair and replacement.

Manage Waste Sustainably and at the Highest Value

12.7 Targets will be used (in line with GLA and Council Policies) for the diversion of waste from landfill, ensuring that material is more productively used wherever possible.

13. Summary

13.1 This report is the Condition and Feasibility Study, with Whole Life Carbon Assessment, for the proposed scheme at Lamorna, Dartmouth Park Road, London, NW5 1SU and provides an overview as to how the proposed scheme has set strategic approach goals in the context of the design and construction considerations.

13.2 The application of Circular Economy philosophy to the built environment is complex with issues overlapping and trade-offs to consider. Nevertheless, a balanced approach has been sought in line with the overarching commitments to sustainable design and construction.

13.3 The proposed scheme includes the demolition of existing single-family dwelling and construction of a new five-storey plus basement residential building consisting of 6x self-contained residential flats (Class C3).

13.4 A review of the GLA's and Camden Council's planning policies has identified a number of relevant requirements, in particular Camden Local Plan Policy CC1 (*Climate Change Mitigation*) and Camden SPD 'Energy Efficiency and Adaption'.

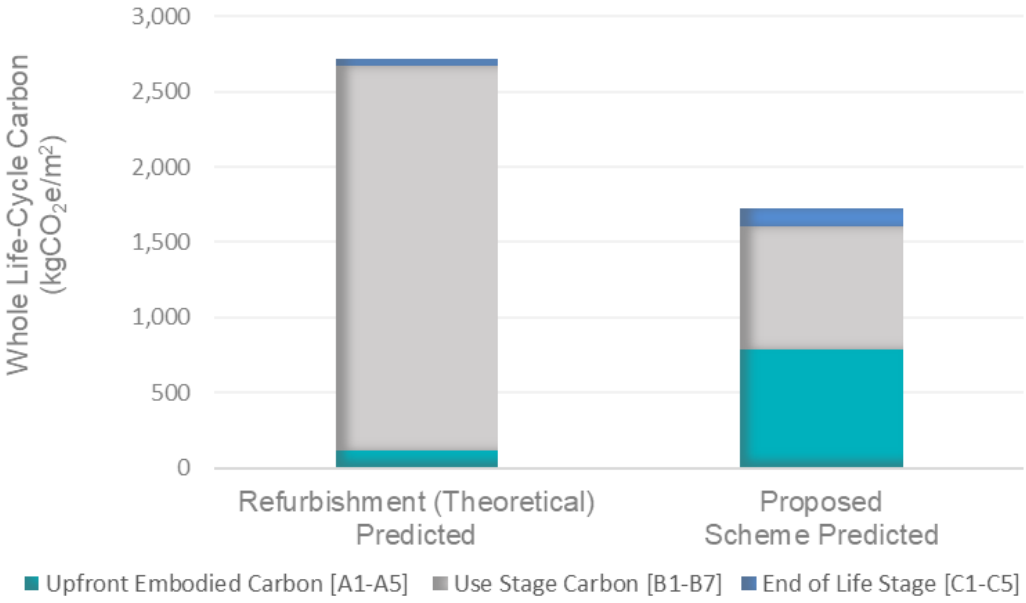
13.5 Consideration has been given to the most appropriate Circular Economy strategic approaches based on the nature and predicted lifespan of the development, and context of the existing site. The study looked at the reuse potential of the existing building on Site by assessing its current use, servicing, technical potential and site capacity.

13.6 Due to the scale of the proposed development, it was not deemed viable to retain the existing structures. Instead, in line with the decision tree in the GLA guidance, the focus has shifted to whether it would be technically feasible to recover the building elements or materials of the previous development. As part of this analysis, the whole life carbon emissions of the proposed development versus a refurbishment scenario were estimated.

13.7 Best available data has been used for the whole life carbon assessment, with the acknowledgement that this assessment for the proposed scheme has been undertaken at a relatively early stage of design. Furthermore, refurbishment of the existing property is not considered viable and, therefore, the assessment of this scenario has been undertaken for comparison purposes only and as such, various assumptions were made in terms of the extent of refurbishment works.

13.8 The assessment has reviewed WLC over a 60-year period, in line with the recommended RICS approach. This identified total WLC emissions for the proposed scheme of 1,074,965 $kgCO_2e$, equivalent to ~1,649 $kgCO_2e/m^2$. In comparison, assessment of the refurbishment scenario of the existing building identified WLC emission of 406,040 $kgCO_2e$, equivalent to ~2,693 $kgCO_2e/m^2$.

Figure 11.1 Proposed Scheme vs Refurbishment Whole Life-Cycle Carbon Emissions - Excluding Biogenic Carbon ($kgCO_2e/m^2$)



13.9 Overall, the Whole Life-Cycle Carbon Assessments undertaken indicate that the proposed scheme would be responsible for approximately 39% less carbon emissions per square metre over its lifetime relative to the theoretical refurbishment of the existing building. This is largely due to the existing building being reliant on gas boilers, whereas the proposed scheme incorporates highly efficient Air Source Heat Pumps (ASHPs), which significantly reduces operational energy use over the 60-year period.

13.10 Additionally, carbon emissions from the pre-construction demolition of the existing building for the proposed scheme may be considered. Using the GLA standard assumption of 50 $kgCO_2e/m^2$ for the GIA of the 151 m^2 building to be demolished, the estimated pre-construction emissions amount to 7,550 $kgCO_2e$. While including these emissions in the total WLC estimated for the proposed scheme leads to an uplift of emissions to 1,082,515 $kgCO_2e$, this still represents over a 62% potential increase for the WLC emissions per square metre for refurbishment relative to the proposed scheme.

13.11 The assessment of Whole Life Carbon has shown that the proposed scheme will likely have benefits in terms of emissions, such as by reducing operational energy use. In addition to this, the current single-family dwelling building would be difficult to reconfigure and refurbish to provide additional dwellings. Given the high accessibility of the Site, maximising use of the land for provision of additional residential dwellings is considered central to achieving optimal site capacity. Furthermore, the redevelopment on brownfield land will also reduce the pressure to develop elsewhere and on greenfield.

Appendices

A. Proposed Floor Plans

1. PROPOSED LOWER GROUND FLOOR PLAN

0 1 2 5

N

bureau de change
Unit 4
6 Hoxton Square
N1 6NU, London

KEY PLAN:

REVISION:

NOTES:

PROJECT	112_LAM
DRAWING TITLE	PROPOSED LOWER GROUND FLOOR PLAN
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PURPOSE OF ISSUE	PLANNING
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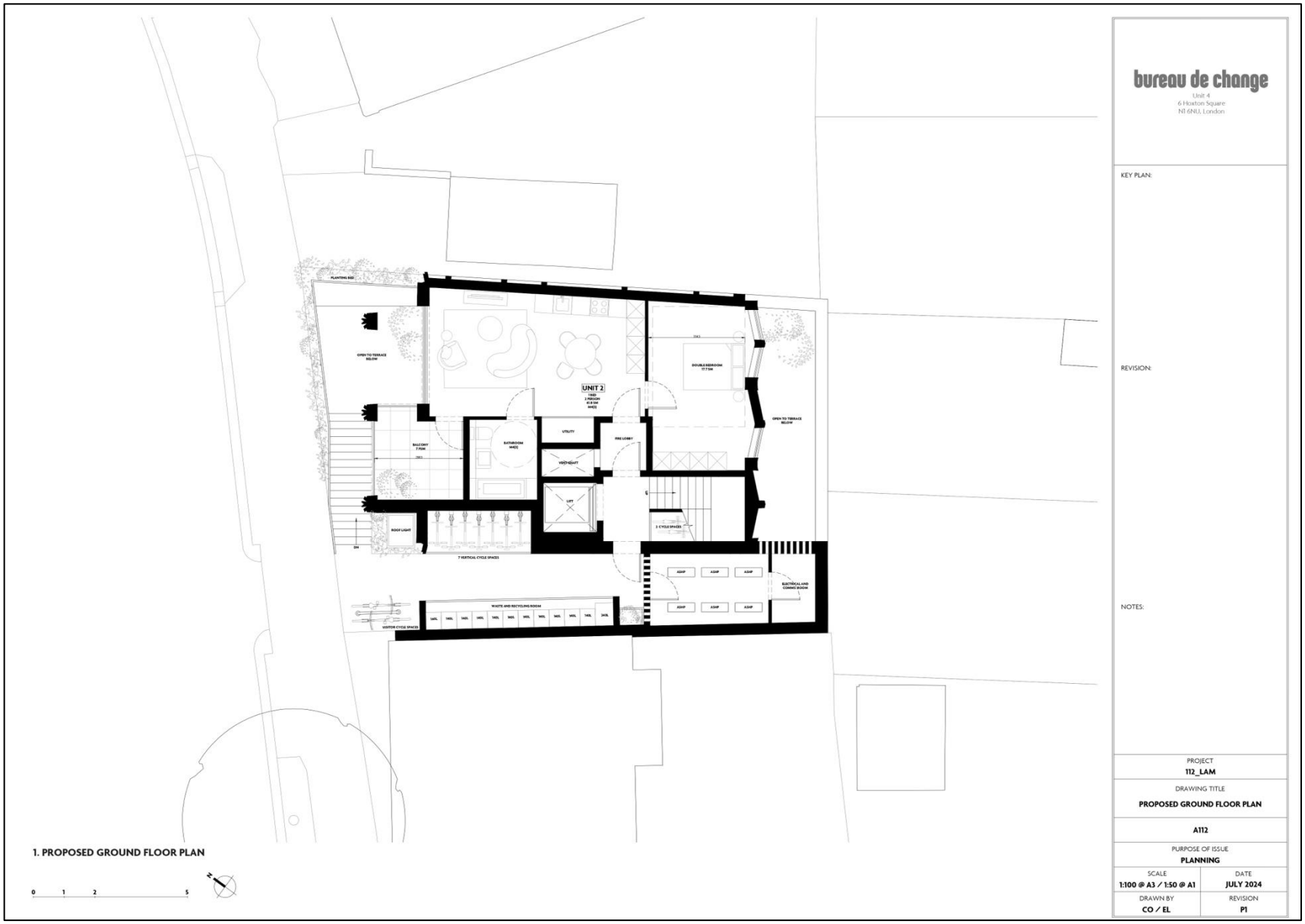
DATE	JULY 2024
DRAWN BY	CO / EL
REVISION	P1



1. PROPOSED GROUND FLOOR PLAN

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Unit 4
6 Hoxton Square
N1 6NU, London

KEY PLAN:

REVISION:

NOTES:

PROJECT	112_LAM
DRAWING TITLE	PROPOSED GROUND FLOOR PLAN
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PURPOSE OF ISSUE	PLANNING
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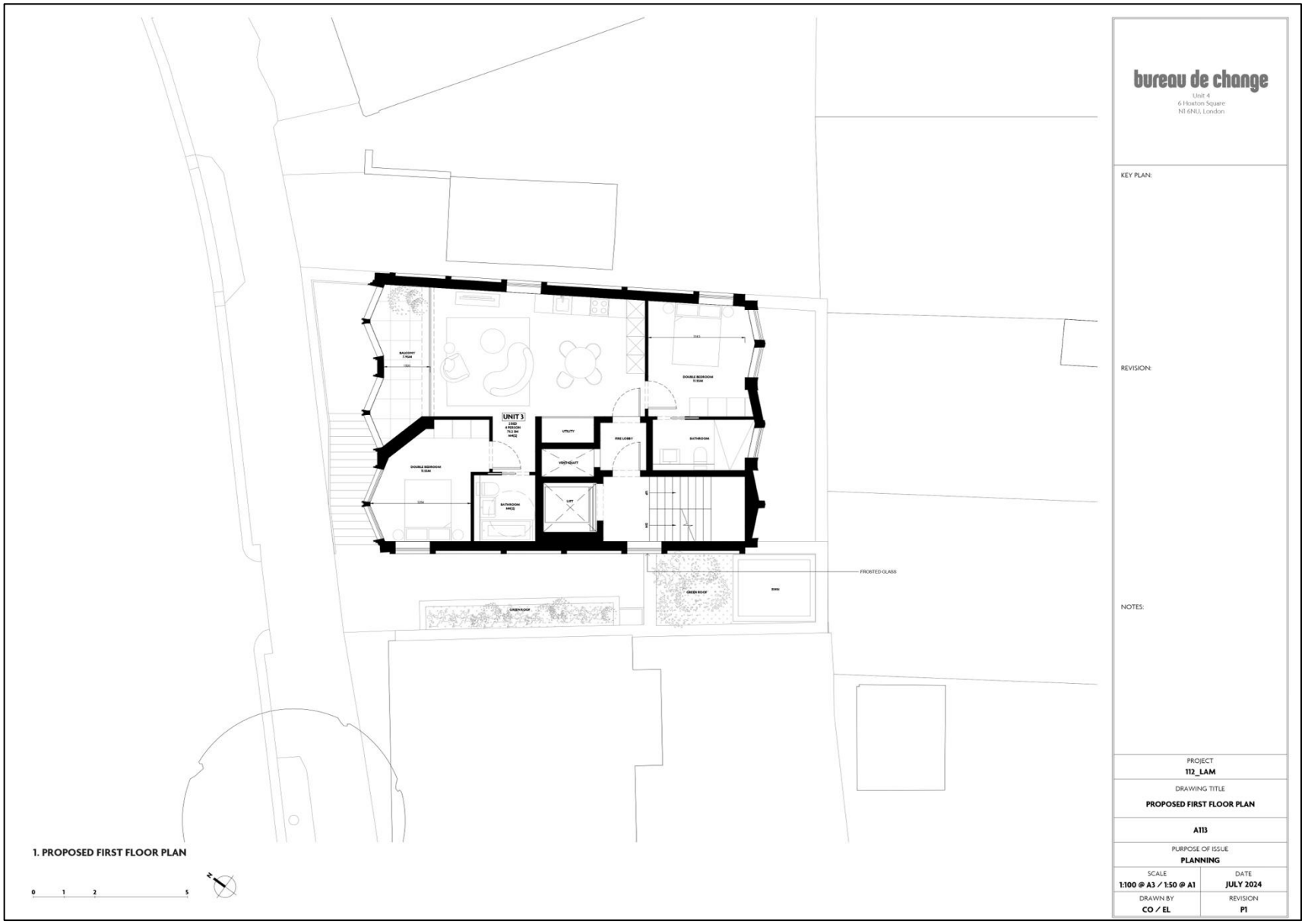
DATE	JULY 2024
DRAWN BY	CO / EL
REVISION	P1


UNIT 3
BALCONY
DOUBLE BEDROOM
UTILITY
FIRE LOBBY
BATHROOM
VOID/SHAFT
DOUBLE BEDROOM
BATHROOM
LIFT
FROSTED GLASS
GREEN ROOF
GREEN ROOF
1. PROPOSED FIRST FLOOR PLAN
0
1
2
5
N
bureau de change
Unit 4
6 Hoxton Square
N1 6NU, London
KEY PLAN:
REVISION:
NOTES:
PROJECT
112_LAM
DRAWING TITLE
PROPOSED FIRST FLOOR PLAN
A113
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DATE
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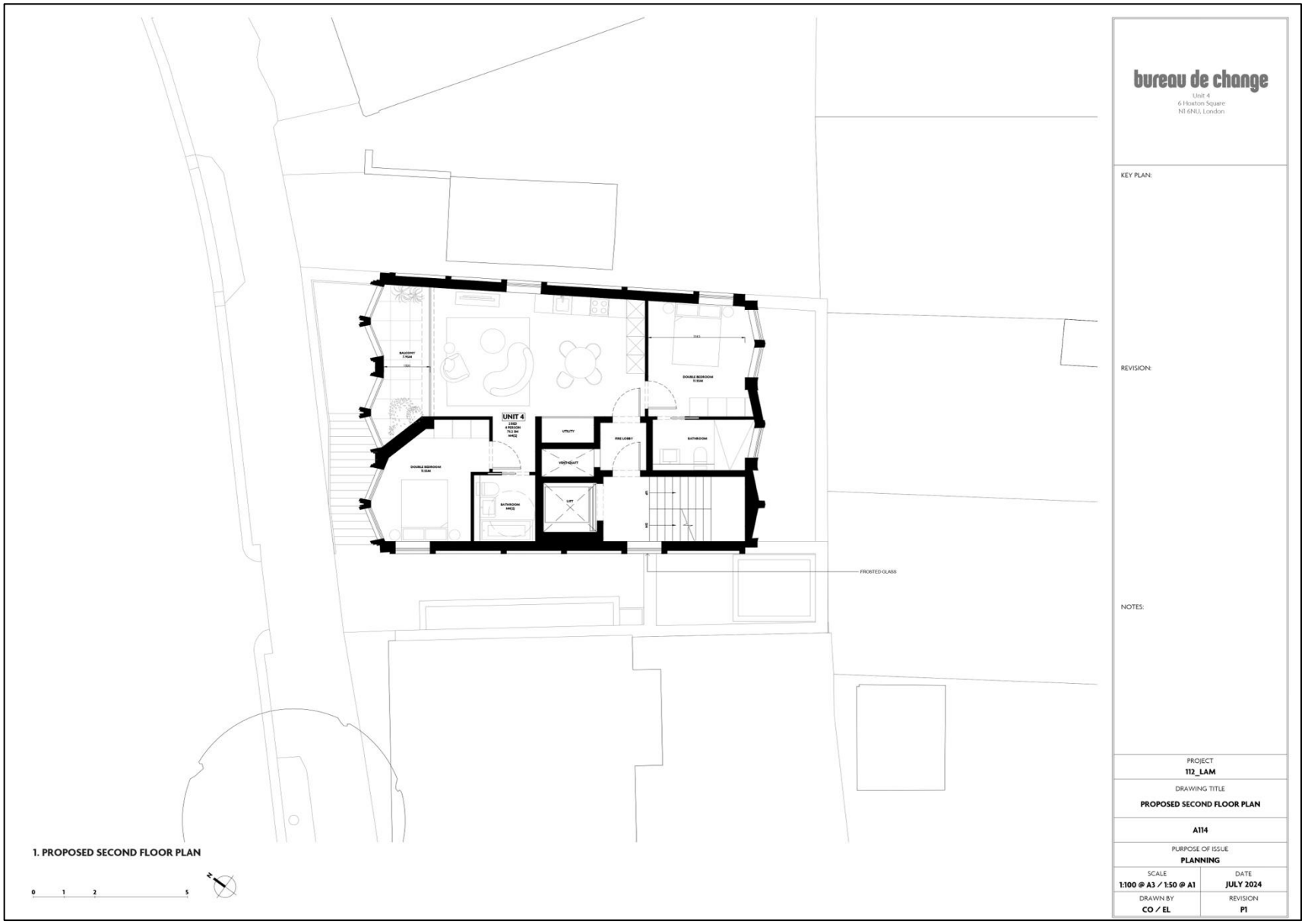
P1



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N1 6NU, London

KEY PLAN:

REVISION:

NOTES:

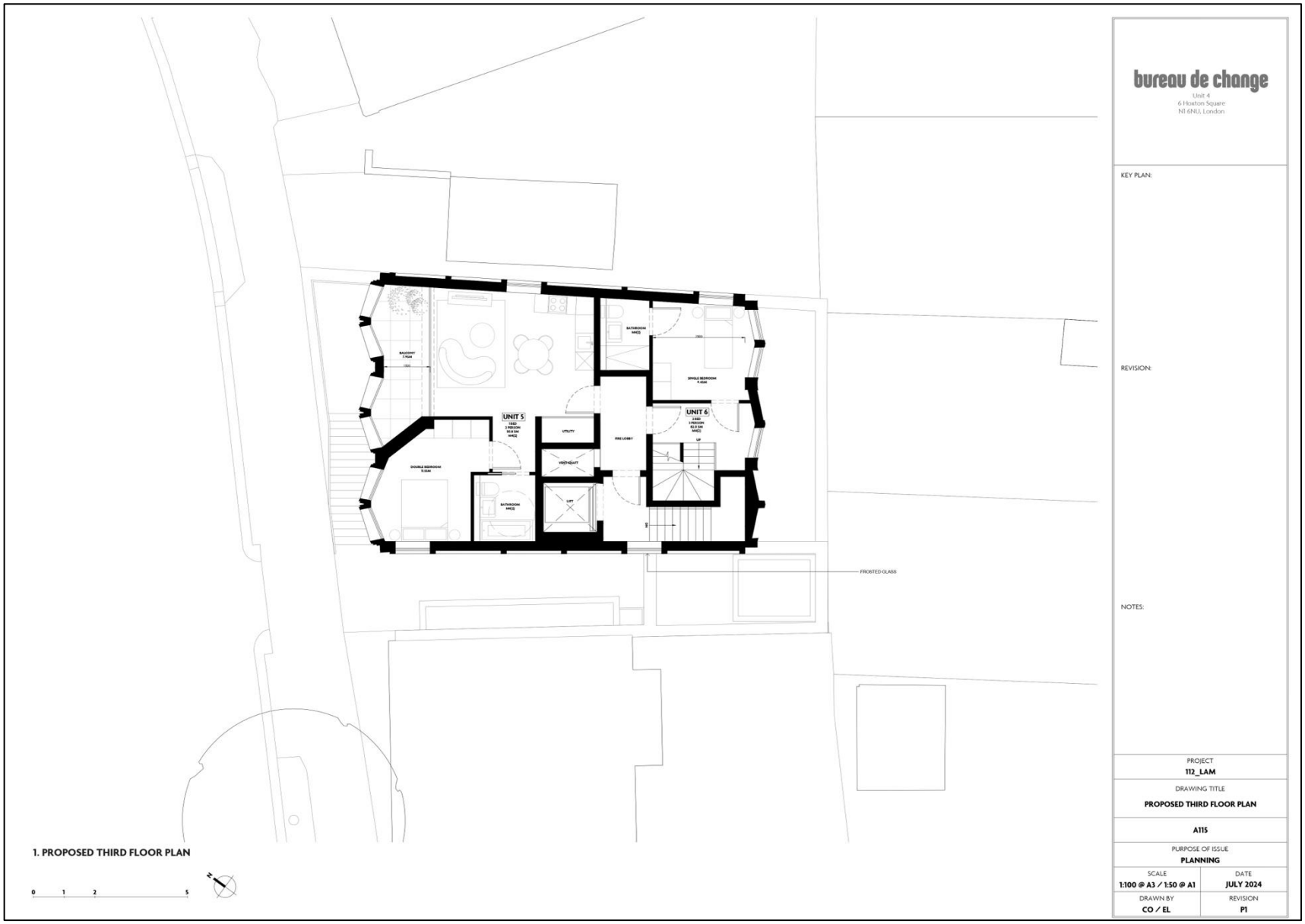
PROJECT
112_LAM

DRAWING TITLE
PROPOSED SECOND FLOOR PLAN

A114

PURPOSE OF ISSUE
PLANNING

SCALE	DATE
1:100 @ A3 / 1:50 @ A1	JULY 2024
DRAWN BY	REVISION
CO / EL	P1



bureau de change
Unit 4
6 Hoxton Square
N1 6NU, London

KEY PLAN:

REVISION:

NOTES:

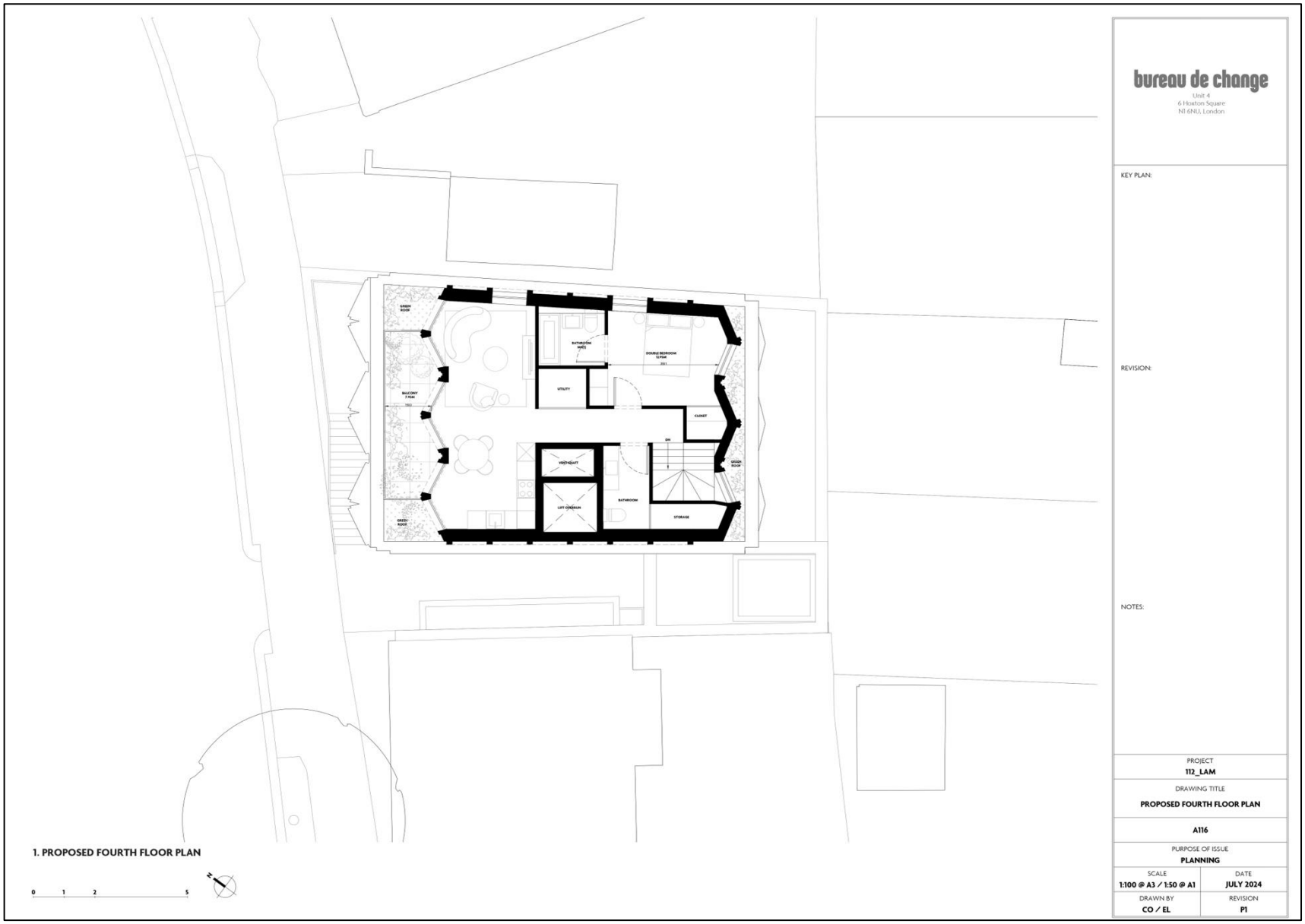
PROJECT
112_LAM

DRAWING TITLE
PROPOSED THIRD FLOOR PLAN

A115

PURPOSE OF ISSUE
PLANNING

SCALE	DATE
1:100 @ A3 / 1:50 @ A1	JULY 2024
DRAWN BY	REVISION
CO / EL	P1



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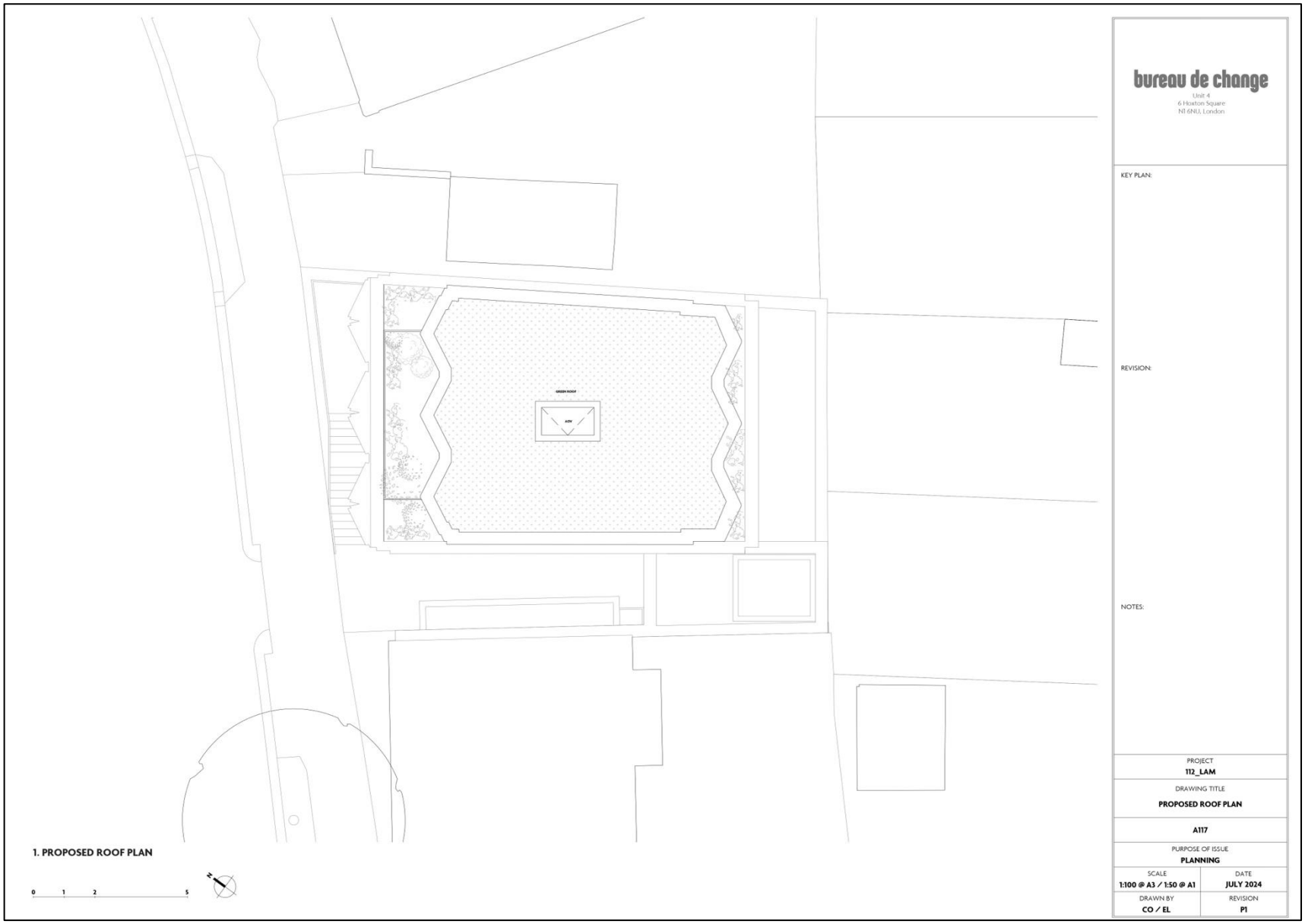
Unit 4
6 Hoxton Square
N1 6NU, London

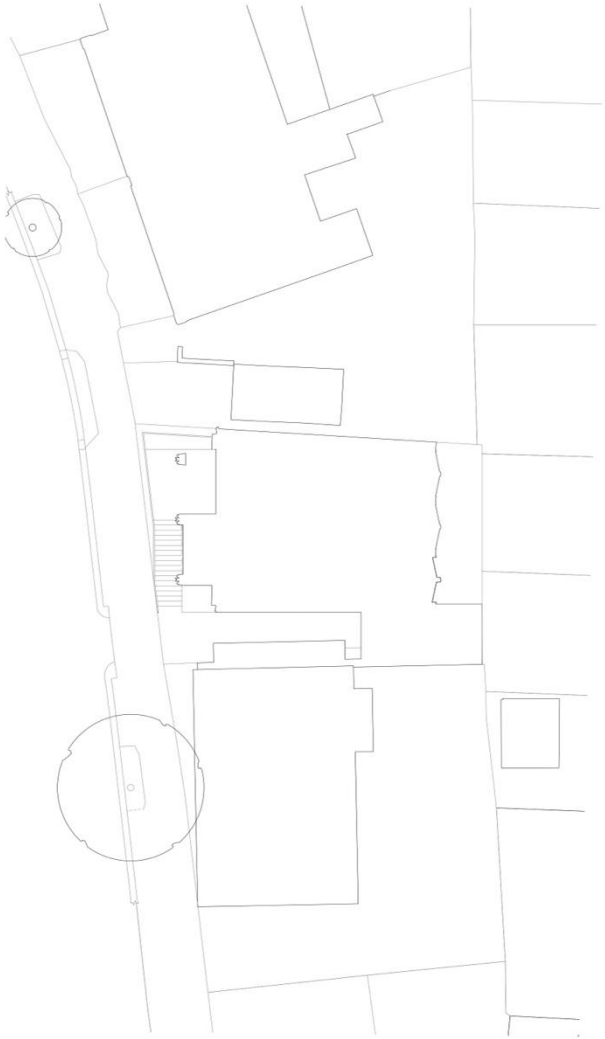
KEY PLAN:

REVISION:

NOTES:

PROJECT **112_LAM**	
DRAWING TITLE **PROPOSED FOURTH FLOOR PLAN**	
A116	
PURPOSE OF ISSUE **PLANNING**	
SCALE **1:100 @ A3 / 1:50 @ A1**	DATE **JULY 2024**
DRAWN BY **CO / EL**	REVISION **P1**


GREEN ROOF
ASV
1. PROPOSED ROOF PLAN
0
1
2
5
N
bureau de change
Unit 4
6 Hoxton Square
N1 6NU, London
KEY PLAN:
REVISION:
NOTES:
PROJECT
112_LAM
DRAWING TITLE
PROPOSED ROOF PLAN
A117
PURPOSE OF ISSUE
PLANNING
SCALE
1:100 @ A3 / 1:50 @ A1
DATE
JULY 2024
DRAWN BY
CO / EL
REVISION
P1



1. PROPOSED SITE PLAN

0 1 2 4 6 8 10

N

bureau de change

Unit 4
6 Hoxton Square
N1 6NU, London

KEY PLAN:

REVISION:

NOTES:

PROJECT **112_LAM**	
DRAWING TITLE **PROPOSED SITE PLAN**	
A110	
PURPOSE OF ISSUE **PLANNING**	
SCALE **1:200 @ A3 / 1:100 @ A1**	DATE **JULY 2024**
DRAWN BY **EL**	REVISION **P1**

B. General Notes

The report is based on information available at the time of the writing and discussions with the client during any project meetings. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by Ensphere Group Ltd for inaccuracies in the data supplied by any other party.

The review of planning policy and other requirements does not constitute a detailed review. Its purpose is as a guide to provide the context for the development and to determine the likely requirements of the Local Authority.

No site visits have been carried out, unless otherwise specified.

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