264 Belsize Road

Sustainability Statement

September 2022

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Document Control

Revision History

Number	Reason	Date
1	For Comment	26th August 2022
1A	Revised as comments	06th September 2022
2	Revised as comments	07th September 2022
2A	For Planning	05th October 2022

Quality Assurance

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Contents

Table of Tables

Table of Figures

Executive Summary

This report is to outline how the proposed development at 264 Belsize Road complies with the sustainable design expectations of the Greater London Authority (GLA) Supplementary Planning Guidance (SPG), superseded Code for Sustainable Homes Design State Assessment (Camden) and Camden Local Plan.

Planning guidance

There is no requirement for a formal sustainable assessment for residential buildings since the code for sustainable homes has broadly been adopted. Camden Council planning documents refer to BRE Home Quality Mark, Passivhaus, or other equivalent standards to demonstrate sustainable residential design.

The BRE Home Quality Mark (HQM) is a voluntary standard taken over from the Code for Sustainable Homes, which is now part of the current building regulations.

Due to the small scale of the project and site constraints, it is not feasible to conduct an HQM assessment for this proposed development, which is a voluntary standard.

This document follows the BRE Home Quality Mark that shares similar standards to the BREEAM rating method to cover the following aspects of HQM for this Development:

Sustainable design and management

All possible passive design measures have been considered, including efficient building fabric, highly-insulated walls and highly efficient glazing, efficient systems (ASHP), the inclusion of green roof, and renewable/low carbon energy sources such as PV to maximise carbon savings for the site.

The considerate contractor scheme is encouraged to be implemented during the construction of the development. Construction site waste will be managed in such a way as to reduce the amount of waste produced as much as possible, and the waste hierarchy will be followed.

Health and wellbeing

The indoor air quality will be maintained through mechanical ventilation with heat recovery (MVHR) using a combination of carbon filters and natural ventilation by opening the windows.

Thermal modelling has been carried out to inform the building design to provide a comfortable thermal environment that considers current climatic conditions and projected climate change scenario conditions.

Daylight simulation indicates all dwellings achieve the average daylight factor of 0.90.

The design team will adopt "Secured by Design security" measures to ensure best-practice guidelines are followed during design development.

Energy

An all-electric Air source heat pump (ASHP) per dwelling with an underfloor heating system is proposed.

Photovoltaic (PV) panels are designed to be roof-mounted, and it is expected to produce 2,854kWh of green electricity annually with 4kWp. That brings 0.3 tonnes of CO_2 yearly due to the use of PV panels in this development.

Energy meters with monitoring software are encouraged to be installed. All internal/external light fittings will be provided with low-energy light fittings (LED) and luminous efficiency greater than 35lm/W.

Transport

The location provides a range of transport options, including the London Overground (50m from Kilburn High Road Overground Station), London Underground (Kilburn Park Underground Station) and excellent links to National Rail.

The Public Transport Accessibility Level (PTAL) rating of 6a confirms that the site has good public transport with an Accessibility Index of 30.6.

Water

This development aims to reduce water consumption to less than 110 litres per person per day ((including 5 litres for external water use), in line with the recommended target set out in the London Plan using water-efficient fittings. Each dwelling is fitted with pulsed output smart water meters.

Material

Materials will be specified to reduce the embodied carbon of the development wherever possible. Responsible sourcing will also be pursued. All timber used on-site during the construction phase and within the building will be from legal sources. Where possible, materials will be sourced locally. Sourcing of other materials will include products where the manufacturer employs an environmental management system such as ISO 14001 or BES 600.

Non-toxic materials will be used wherever possible, including the specification of products with a low VOC content in line with European testing standards.

All the building elements will achieve high ratings on the BRE Green Guide to Specification. Materials will be specified to have a low embodied energy, considering the whole life cycle analysis.

Waste management

Construction site waste will be managed in such a way as to reduce the amount of waste produced as much as possible, and the waste hierarchy will be followed. Regular waste and recycling bins will be provided to separate waste to facilitate recycling. In addition, at least 85% of waste that does arise will be recycled using an external waste contractor.

Noise

The development will comply with Building Regulations Part E, providing good sound insulation. All windows are specified as high-efficiency double glazing to minimise noise transmission between the property and the surrounding area.

Air quality

The construction site will be managed so that the environmental impact is minimised. This includes following best practice policies for dust pollution by using dust sheets, covering skips and damping down where appropriate.

Insulating materials and heating systems will be specified to keep pollutants to a minimum. Insulation will have a low Global Warming Potential (GWP). Including a green roof will improve the site's air quality.

Landscape and ecology

The development is considered low-moderate ecological value within the local context as there is an existing structure on the site. Measures will be taken during construction to minimise the impact on ecology by timing works appropriately, following best practice guidance, and through the soft landscape design.

The development has a private garden per dwelling and a green roof. Mixed planting is recommended on the green roof. A green sedum roof is laid over the retained section, and biodiversity will be introduced into the green roof. The green roof design enhances the local environment and improves public amenity areas. It also improves the relationship between the new accommodation and the neighbours.

The development is in flood zone 1, an area with a low probability of flooding. The inclusion of a green roof dissipates any excess water over an extended period, enabling the terrestrial drainage systems to cope better.

1 Introduction

1.1 The purpose of this document is to outline how the proposed 264 Belsize Road Development complies with the sustainable design expectation of the Greater London Authority (GLA) Supplementary Planning Guidance (SPG) and Code for Sustainable Homes Design State Assessment (Camden) and as set out in the following planning documents;

- Sustainable Design and Construction SPG (GLA) April 2014
- Neighbourhood Plan in Camden 2014
- Home Improvements Camden Planning Guidance January 2021
- Camden Local Plan 2017
- Camden Climate Action Plan 2020

1.2 Sustainable design has an important role in helping to avoid increased vulnerability to the range of impacts arising from climate change and in managing risks through adaptation. The sustainable design aims to minimise the adverse effects of the development on the environment and the health and comfort of building occupants, thereby improving building performance. The sustainability objectives are to reduce the consumption of non-renewable resources, minimise waste, and create healthy, productive environments. Sustainable design standards include the following aspects:

- Energy use and carbon emissions
- Sustainable building standards
- Water consumption
- Biodiversity and access to nature
- Climate change adaptation: flood and overheating risk
- Sustainable materials, waste, and construction impacts
- Operational sustainability

1.3 There is no requirement for a formal sustainable assessment for residential buildings since the code for sustainable homes has broadly been adopted. Camden Council planning documents refer to BRE Home Quality Mark, Passivhaus, or other equivalent standards to demonstrate sustainable residential design.

1.4 The BRE Home Quality Mark (HQM) is a voluntary standard which superseded the Code for Sustainable Homes, which is now part of the current building regulations.

1.5 Due to the scale of the project and site constraints, this document follows the BRE Home Quality Mark that shares similar standards to the BREEAM rating method to cover various aspects of sustainability for this development such as construction management, health and wellbeing, energy, transport, water, materials, waste, and flooding, landscape and ecology.

1.6 This document should be read in conjunction with:

- Design and Access Statement
- Energy Statement
- Overheating analysis report

Proposed Development

1.7 This development contains 5 no. two-bedroom duplex dwellings. Each property would have access to a private garden or balcony.

1.8 Full details of the proposal are set out in Alan Power Architects Ltd.'s Design and Access Statement. The proposed development includes 5 residential units as above, and ***it is not regarded as a major development*** according to the London Plan 2021 (FLA of 580m² <1000m²).

Site location

1.9 Location: 264 Belsize Road, Kilburn, London, NW6 4BT. Proposed dwelling units face southeast.

Figure 1 Site location (Open Street Map 2022)

1.10 The site is located in Kilburn within the Borough of Camden. It is located on the northern side of Belsize Road (https://www.openstreetmap.org/#map=19/51.53769/-0.19249). The site area is approximately 470m², previously occupied by a redundant mixed-use commercial/non-residential institution building. The site is within an Archaeological Priority Area due to its proximity to an old Roman road, now the A5. It is approximately 40 metres east of Kilburn High Road. It is adjacent to the Priory Road Conservation Area but is not in the Conservation Area itself.

1.11 The site has a Public Transport Accessibility Level (PTAL) rating of 6a. It is approximately 40 metres east of Kilburn High Road and next to bus stops, Overground Station (Kilburn High Road), and Underground (Kilburn Park).

2 Planning Policies

National Policy

2.1 The National Planning Policy Framework ('NPPF') was published in February 2019 and superseded the 2012 and 2018 editions.

2.2 The NPPF includes a 'presumption in favour of sustainable development. It states that for plan-making, the presumption means that local authorities should positively seek opportunities to meet the development needs of their area and that plans should meet objectively assessed needs. Plans should also be based on the Local Plan.

2.3 Planning policies and decisions should plan positively for the provision and use of shared spaces, community facilities (such as local shops, meeting places, sports venues, open spaces, cultural buildings, public houses, and places of worship) and other local services to enhance the sustainability of communities and residential environments.

2.4 New Development should be planned for in ways that can help to reduce greenhouse gas emissions, in consideration of its location, orientation, and design. Any local requirements for the sustainability of buildings should reflect the Government's policy or national technical standards.

London Plan

2.5 The London Plan is the mayor's planning strategy for Greater London. It sets borough-level housing targets and identifies locations for future growth of London-wide importance.

2.6 The London Plan guides boroughs' development Plans to ensure they work towards a shared vision for London. It establishes policies that allow everyone involved in new developments to know what is expected.

2.7 To support London's resilience to a changing climate and tackle climate change, the London Plan contains a range of policies relating to sustainable design and construction.

Sustainable design and construction

2.8 Sustainable Development is a development that meets the needs of the present generation without compromising the ability of future generations to meet their own social, economic, and environmental needs. The development industry needs to implement sustainable design and construction practices for sustainable development. Sustainable Development considers how the design, building services and project management from inception can influence the number of resources used during a development's construction, occupation, and management.

Policy 5.3 Sustainable design and construction

A) The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime

PLANNING DECISIONS

B) Development proposals should demonstrate that sustainable design standards are integral to the proposal, including its construction and operation, and ensure they are considered at the beginning of the design process.

C) Major development proposals should meet the minimum standards outlined in the mayor's supplementary planning guidance, which should be demonstrated within a design and access statement. The standards include measures to achieve other policies in this Plan and the following sustainable design principles:

1) minimising carbon dioxide emissions across the site, including the building and services (such as heating and cooling systems)
2) avoiding internal overheating and contributing to the urban heat island effect
3) efficient use of natural resources (including water), including making the most of natural systems both within and around buildings
4) minimising pollution (including noise, air, and urban run-off)
5) minimising the generation of waste and maximising re-use or recycling
6) avoiding impacts from natural hazards (including flooding)
7) ensuring developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions
8) securing sustainable procurement of materials, using local supplies where feasible, and
9) promoting and protecting biodiversity and green infrastructure.

LDF PREPARATION

D) Within LDFs, boroughs should consider developing more detailed policies and proposals based on the sustainable design principles outlined above and those outlined in the mayor's supplementary planning guidance specific to their local circumstances.

Table 1 GLA London Plan SPG 5.3.

2.9 It is generally acknowledged that designing sustainability measures at the outset of a development's design can minimise additional perceived costs. Therefore, designers must consider the guidance in this Supplementary Planning Guidance (SPG) at the inception of their development and during the procurement and construction stages, setting clear targets from the outset.

Water infrastructure

2.10 The UK has less water per person than most other European countries. London is drier than Istanbul, and the South East of England has less water available per person than Sudan and Syria.

2.11 As our population grows, increased numbers of people share this limited resource. Also, the more water consumed, the less available for the environment. Therefore, it is vital to use water wisely and not waste it.

2.12 Londoners consume, on average, 149 litres of water per person per day – around 8 litres above the national average. All water companies that serve London are in areas classified as seriously water-stressed. London is at risk of drought after two dry winters.

Policy SI 5 Water Infrastructure

A) To minimise the use of mains water, water supplies and resources should be protected and conserved sustainably.

B) Development Plans should promote improvements to water supply infrastructure to contribute to the security of supply. This should be done in a timely, efficient, and sustainable manner, taking energy consumption into account.

C) *Development proposals should:*

1) using Planning, Conditions minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption)
2) achieve at least the BREEAM excellent standard for the 'Wat 01' water category160 or equivalent (commercial development)
3) Incorporate smart metering, water-saving, and recycling measures, including retrofitting, to help achieve lower water consumption rates and maximise future-proofing.

D) *In terms of water quality, Development Plans should:*

4) promote the protection and improvement of the water environment in line with the Thames River Basin Management Plan, and should take account of Catchment Plans
5) Support wastewater treatment infrastructure investment to accommodate London's growth and climate change impacts. Such infrastructure should be constructed in a timely and sustainable manner taking into account new, smart technologies, intensification opportunities on existing sites, and energy implications. Boroughs should work with Thames Water concerning local wastewater infrastructure requirements.

E) *Development proposals should:*

6) seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided
7) take action to minimise the potential for misconnections between foul and surface water networks.

F) *Development Plans and proposals for strategically or locally defined growth locations with flood risk constraints or where there is insufficient water infrastructure capacity should be informed*

Table 2 GLA London Plan SI 5

2.13 An essential aspect of avoiding the most severe water restrictions is reducing leakage and using water as efficiently as possible. The Optional Requirement set out in Part G of the Building Regulations should be applied across London. A fittings-based approach should be used to determine water consumption. This approach is transparent and compatible with developers' procurement and the emerging Water Label, which Government and the water companies serving London are supporting.

2.14 Security of supply should be ensured. Even with increased water efficiency and reduced leakage, water companies forecast growing demand for water. Without additional sources of supply, the increased demand will increase the risk of requiring water restrictions during drought periods.

2.15 In the context of the significant investment needed, measures to protect and support vulnerable customers from rising water bills are important.

2.16 In this fast pace changing period of digital technology, digital infrastructure is essential for the proper functioning of the development of energy, water, and waste management services. It should be treated with the same importance. Therefore, Development Plans should support the delivery of full-fibre or equivalent digital infrastructure, focusing on areas with gaps in connectivity and barriers to digital access (GLA London Plan SI 6B).

2.17 Development proposals should also demonstrate that mobile connectivity will be available throughout the development and should not have detrimental impacts on the digital connectivity of neighbouring buildings. Early consultation with network operators will help identify any adverse effects on mobile or wireless connectivity and appropriate measures to avoid/mitigate them.

Waste and circular economy

2.18 Waste is defined as anything that is discarded. A circular economy is one where materials are retained at their highest value for as long as possible and re-used or recycled, leaving minimal residual waste.

2.19 The London Environment Strategy sets out a pathway to achieving a municipal recycling target of 65 per cent by 2030 and outlines the mayor's approach to municipal waste management in detail. This includes London achieving a 50 per cent reduction in food waste and associated packaging waste per person by 2030. London local authorities need to provide residents with a minimum level of recycling service, including separate food waste. To achieve these recycling targets, it will be important that recycling, storage, and collection systems in new developments are appropriately designed. Further detail on how developments should do this is set out in the guidance.

Policy SI 7 Reducing waste and supporting the circular economy

A) *Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the mayor, waste planning authorities and industry working in collaboration to:*

1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible
2) encourage waste minimisation and waste prevention through the re-use of materials and using fewer resources in the production and distribution of products
3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026
4) meet or exceed the municipal waste recycling target of 65 per cent by 2030
5) meet or exceed the targets for each of the following waste and material streams:
    a) construction and demolition – 95 per cent reuse/recycling/recovery
    b) excavation – 95 per cent beneficial use
6) design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

B) *referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted to demonstrate:*

	1) how all materials arising from demolition and remediation works will be re-used and/or recycled 2) how the proposal's design and construction will reduce material demands and enable building materials, components, and products to be disassembled and re-used at the end of their useful life 3) opportunities for managing as much waste as possible on site 4) adequate and easily accessible storage space and collection systems to support recycling and re-use 5) how much waste the proposal is expected to generate, and how and where the waste will be managed following the waste hierarchy 6) how performance will be monitored and reported.
C)	*development Plans that apply circular economy principles and set local lower thresholds for the application of Circular*

Table 3 GLA London Plan SI 7

2.20 The re-use/recycling of building materials and aggregates is a significant and well-established component of the circular economy advocated in Policy SI 7. Reducing waste, supporting the circular economy, and reducing the demand for natural materials.

2.21 The Development Plan should ensure the sufficient capacity of aggregates, wharves, and aggregate rail depots are available to ensure a steady and adequate supply of imported and marine aggregates to London and maximise the movement of aggregates by sustainable modes (GLA London Plan SI 10B).

2.22 Development Plan supports the production of recycled/secondary aggregates and, where practicable, expands capacity at/or adjacent to aggregates, wharves, rail depots, and quarries during their operational life, within or adjacent to major construction projects (GLA London Plan SI 10B).

2.23 Development proposals should ensure that flood risk is minimised and mitigated and that residual risk is addressed. The proposal should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses (GLA London Plan SI 12C).

2.24 Drainage should be designed to promote multiple benefits, including increased water use efficiency, improved water quality, enhanced biodiversity, urban greening, amenity, and recreation (GLA London Plan SI 13D).

London Borough of Camden

2.25 The Council aims to tackle the causes of climate change in the borough by ensuring developments use less energy and assessing the feasibility of decentralised energy and renewable energy technologies.

2.26 Any new development in Camden can potentially increase carbon dioxide emissions in the borough. Suppose we are to achieve local and support national carbon dioxide reduction targets. In that case, it is crucial that planning policy limits carbon dioxide emissions from new development wherever possible and supports sensitive energy efficiency improvements to existing buildings.

2.27 The Council will seek to minimise and mitigate climate change by requiring developments to incorporate the three aspects of the energy hierarchy of the London Plan 2021: Firstly, reducing the demand for energy (lean option), secondly supplying energy in the most efficient way (clean option), and thirdly using renewable energy sources (green option).

Policy CC1 Climate change Mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest possible environmental standards that are financially viable during construction and occupation.

We will:

a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;

b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;

c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;

d. support and encourage sensitive energy efficiency improvements to existing buildings;

e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and

f. expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;

h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and

i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

Table 4 Camden Local Plan CC1 (March 2021)

2.28 New developments in Camden will be expected to minimise energy use and CO_2 emissions by applying the energy hierarchy. The Council's Sustainability Plan' Green Action for Change' commits the Council to seeking low and zero-carbon buildings. It is understood that some sustainable design measures may be challenging for listed buildings and some conservation areas, and we would advise developers to engage early with the Council to develop innovative solutions.

2.29 Adapting to a changing climate is identified in Camden's environmental sustainability plan, Green Action for Change (2011-2020). The three key risks that require adaptation are flooding, drought and overheating. Specific design measures and 'green infrastructure' such as green roofs, green walls and open spaces can help mitigate some of these risks.

Policy CC2 Adapting to climate change

The Council will require development to be resilient to climate change. All development should adopt appropriate climate change adaptation measures such as:

The protection of existing green spaces and promoting new appropriate green infrastructure;

a. *not increasing, and wherever possible reducing, surface water run-off through increasing permeable surfaces and use of Sustainable Drainage Systems;*
b. *incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and*
c. *measures to reduce the impact of urban and dwelling overheating, including the application of the cooling hierarchy.*
d. *Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.*
e. *Sustainable design and construction measures*
f. *The Council will promote and measure sustainable design and construction by:*
g. *ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;*
h. *encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;*
i. *encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and*
j. *expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.*

Table 5 Camden Local Plan CC2 (March 2021)

2.30 To minimise the risks of climate change, the London Borough of Camden will expect the design of developments to consider anticipated changes to the climate.

2.31 Development should also consider the impacts of overheating and flooding on human health and should be designed so that they are adaptable in accordance with policies CC2 Adapting to climate change and CC3 Water and flooding.

2.32 As noted in Policy CC2, adapting to climate change, flooding and drought are key risks which require mitigation and adaptation measures in the borough. Camden has experienced significant flooding events in the recent past, and the probability of such recurring events is likely to increase due to climate change. Changes to our climate can also threaten the quantity and quality of our water supply. Such risks impact the health and wellbeing of Camden residents.

Policy CC3: Water and Flooding

Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible.

We will require development to:

a. incorporate water efficiency measures;

b. avoid harm to the water environment and improve water quality;

c. consider the impact of development in areas at risk of flooding (including drainage);

d. incorporate flood resilient measures in areas prone to flooding;

e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and

f. not locate vulnerable development in flood-prone areas.

Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable. The Council will protect the borough's existing drinking water and foul water infrastructure, including the reservoirs at Barrow Hill, Hampstead Heath, Highgate and Kidderpore.

Table 6 Camden Local Plan CC3 (March 2021)

2.33 Developments must be designed to be water efficient. This can be achieved by installing water-efficient fittings and appliances (which can help reduce energy consumption and water consumption) and by capturing and re-using rain water and grey water on-site. Residential developments will be expected to meet the requirement of 110 per person per day (including 5 litres for external water use).

Policy CC5: Waste

The Council will seek to make Camden a low waste borough. We will:

a) Aim to reduce the amount of waste produced in the borough and increase recycling and the re-use of materials to meet the London Plan targets of 50% of household waste recycled/composted by 2020 and aspiring to achieve 60% by 2031;

b) deal with North London's waste by working with our partner boroughs in North London to produce a Waste Plan, which will ensure that sufficient land is allocated to manage the amount of waste apportioned to the area in the London Plan;

c) safeguard Camden's existing waste site at Regis Road unless a suitable compensatory waste site is provided that replaces the maximum throughput achievable at the existing site; and

d) make sure that developments include facilities for storing and collecting waste and recycling.

Table 7 Camden Local Plan CC5 (March 2021)

2.34 The Council recognises that Camden cannot adequately deal with its isolated waste. Therefore, it is a member of the North London Waste Authority, which is responsible for the disposal of waste collected in the boroughs of Barnet, Camden, Enfield, Haringey, Hackney, Islington and Waltham Forest and is working in partnership with these authorities to prepare a joint North London Waste Plan (NLWP).

3 Management

Responsible Construction

3.1 The Considerate Constructors Scheme (CCS) is a national initiative the UK construction industry set up to improve its image. The scheme is a self-financing, independent organisation owned by the Construction Umbrella Bodies (Holdings) Ltd (the Construction Products Association and the Construction Industry Council). Sites and companies registering with the scheme sign up and are monitored against a Code of Considerate Practice designed to encourage best practices beyond statutory requirements.

Pre-Demolition Audit

3.2 As part of RIBA Stage 3 works, the design team will complete a pre-demolition audit of any existing buildings, structures or hard surfaces being considered before stripping out. The scope of the pre-demolition audit is to consider materials for re-use and set targets for waste management. The pre-demolition audit will be regarded as if buildings can be re-used or recycled to maximise material recovery for subsequent high-grade or value applications.

3.3 This project intends to retain the existing structure and re-use or recycle the existing building material to maximise its sustainability potential and reduce embodied carbon emissions related to this development where possible new material will be sourced locally.

3.4 The principal contractor will operate an environmental management system (EMS) covering their primary operations. The EMS will be either:

- Third-party certified, to ISO 14001/EMAS or equivalent standard; or
- Compliant with BS 8555:2016

3.5 The principal contractor will implement best practice pollution prevention policies and procedures on-site following Pollution Prevention Guidelines, working at construction and demolition sites: PPG61

Construction Management Plan

3.6 At this early RIBA planning stage 2, a contractor has not been appointed to undertake the construction works. However, the information and parameters within this document will form part of any tender documentation. The appointed contractor will be required to comply with the outlined methodology described.

3.7 This statement describes the anticipated demolition and construction works programme and the critical activities undertaken on the site concerning the development.

3.8 The broad principles of a framework site-wide Construction Management Plan (CMP) are identified in this report. As part of the tendering process, the main contractors will be required to submit a statement demonstrating how they will comply with the CMP and, after the appointment, provide detailed documentation to prove this compliance.

3.9 Creating Employment Opportunities for local people

3.10 To ensure local people are employed on site, it is recommended that the selected contractor be encouraged to take on young apprentices or administration staff who live or study within the borough as part of their employment. During the construction process, there are many opportunities where some can be given an opportunity for employment or new skills. Often local higher education colleges have lists of possible candidates who may benefit from the experience.

Dust Suppression Measures

3.11 The best practicable means of preventing, reducing and minimising dust will be adopted. The proposed development will adhere to the relevant Code of Practice during construction.

3.12 Under the Considerate Contractors Scheme, reasonable practice procedures will be followed to mitigate noise, vibration, and air pollution impacts. Measures currently planned to include:

- Hydraulic construction to be used in preference to percussive techniques where practical;
- Off-site prefabrication to be used, where applicable.
- All plant and equipment used for the works must be maintained, silenced where appropriate and operated to prevent excessive noise. To be switched off when not in use and where practicable;
- The plant will be certified to meet relevant current legislation and British Standards;
- Loading and unloading of vehicles, dismantling of site equipment such as scaffolding, or moving equipment or materials around the site will be conducted in such a manner as to minimise noise generation;
- The constructor will not burn waste on site;
- As far as possible, construction works will be carried out using methods that minimise noise. In some specific cases, there is little reasonable choice other than to use percussion tools in one form or another. Quieter types of machinery will be specified for these works where possible.

Wheel Washing /Road Cleanliness

3.13 During the construction, the contractor is recommended to provide an appropriate wheel-washing system to remove mud, stones and any other extraneous materials from the wheels and chassis of construction vehicles exiting the site, and all loads of excavation spoil or other such matter shall be fully covered.

3.14 Suitable measures to minimise dust nuisance caused by the operations and to ensure that no dust or other debris is carried on to the adjoining properties shall also be provided.

Construction Vehicle Movements / Deliveries

3.15 Goods vehicle movements during the construction phase will be monitored closely. Site coordination is key to the project's success and will require a team member to control and manage the site.

3.16 The contractor will set up the site to provide adequate room for storing materials- i.e., masonry/stone; however, it is expected that significant components such as steelwork will be programmed to arrive just in time. A delivery zone will be established on site and will hold a minimum of one HGV at any time. The proposed development scale is such that no provision of an off-site holding area for vehicles is anticipated to be required.

Public Relations / Complaints Procedures

3.17 The contractor's site agent will handle all complaints and enquiries. This individual will be named at the site entrance, with a contact telephone number.

3.18 Any complaints will be logged on site, thoroughly investigated and reported to the client as soon as possible. The complainant will be informed as to what action will be taken. In unusual activities or events, the client and other relevant third parties (i.e., statutory and non-statutory bodies) will be notified before the work is carried out.

Commissioning

3.19 The main contractor will employ a specialist commissioning manager who is a specialist contractor rather than a general sub-contractor, able to independently verify the work carried out by the project team members installing the systems.

Building Services Commissioning

3.20 The commissioning manager will review the design and oversee the installation and commissioning of the building services, including but limited to the following elements – heating systems, hot and cold-water services, mechanical ventilation, life safety systems, building management systems, security and access control systems, renewable energy sources, and any other complex systems.

Building Fabric Commissioning

3.21 It is good practice to assess thermal bridging assessments at the design stage. The bridging assessment is encouraged through building regulations for energy conservation by allowing actual values in the energy calculation, which could significantly improve using the default values in the National Calculation Methodology (NCM).

Handover and Training

3.22 The contractor will be required to provide a building training day before the handover and occupation of the building. The training schedules shall include the following as a minimum:

- The building's design intent.

Additionally, for the building occupiers' training schedule:

- Introduction to the non-technical building user guide for building occupiers and relevant building documentation.

Additionally, for the facilities managers' training schedule:

- Aftercare provision and aftercare team primary contacts include scheduled commissioning and post-occupancy evaluation.
- Introduction to and demonstration of installed systems and key features, particularly building management systems, controls, and interfaces.
- Introduction to the technical building user guide for facilities managers and other relevant building documentation, e.g., design data, technical guides, maintenance strategy, operations, and maintenance (O&M) manual, commissioning records, log book etc.
- Maintenance requirements, including any maintenance contracts and regimes in place.

3.23 This section presents a solution to undertake sustainable construction and dust management following the relative policy and guidance in sustainable design, construction, and dust/waste management.

4 Health and Wellbeing

4.1 The health and Well-being category encourages building users' increased health, wellbeing, and safety. Issues within this category reward building design and specification decisions that create a healthy, safe, and comfortable internal and external environment.

Visual Comfort

4.2 Visual comfort provides internal daylight conditions that facilitate good visual comfort by designing the potential for glare, achieving good practice daylight factors and having an excellent outside view. Figure 2 indicates all dwellings achieve an average daylight factor of 0.90.

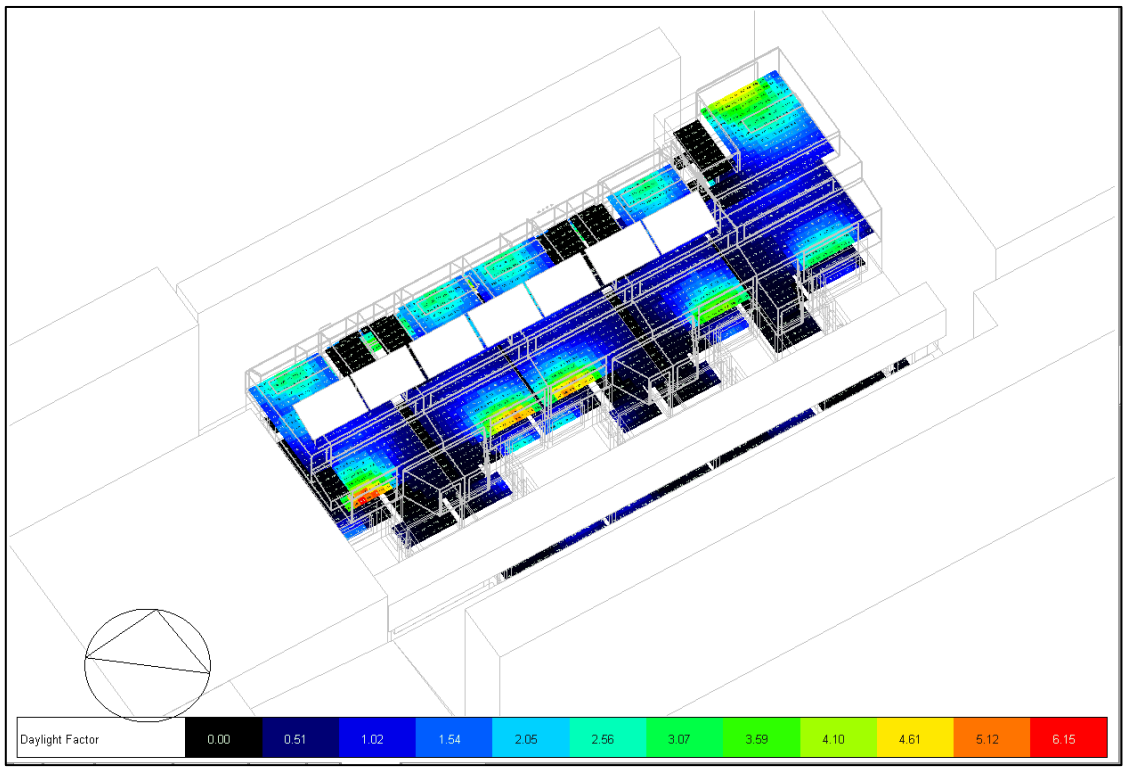


Figure 2 Daylighting simulation Result from Design Builder

Indoor Air Quality

4.3 Indoor air quality is maintained through mechanical ventilation with heat recovery (MVHR) using a combination of carbon filters and natural ventilation by opening the windows. The MVHR is sized to provide background ventilation with heat recovery from the exhaust air and a summer bypass of the heat recovery element.

Thermal Comfort

4.4 It is also crucial that the potential impact on future occupants of the thermal comfort/cooling strategy is appropriately considered, especially if open windows are relied upon to relieve overheating.

4.5 Thermal modelling has been carried out to inform the building design to provide a comfortable thermal environment that considers current climatic conditions and projected climate change scenario conditions.

4.6 The planning application document includes a separate dynamic overheating risk analysis report. The dynamic overheating analysis indicates that all dwellings achieve a good level of overheating risk.

Secured by Design

4.7 The design team is recommended to meet with the London Borough of Camden's local crime prevention officer to agree and adopt suitable measures as part of the building design to keep the site and its occupants safe. The design team will adopt "Secured by Design security" measures to ensure best-practice guidelines are followed during design development. The below points summarise some of the concerns and measures that will be addressed.

4.8 The dwellings will be designed to match 'secured by design standards, and the development will cover the following:

1) CCTV system (monitoring live 24/7) with visitor door entry covering communal entrances (where Secure (Communal) Mail Delivery facilities) and internal lobby areas will be introduced. The installation complies with the regulation (BS 7958: 2015 Closed Circuit television Management and Operation).
2) The electricity meters are to be located outside the access-controlled areas.
3) Frames, doors and locks have a secured design to pass BS7950/PAS 24 standards.
4) All ground floor windows and access from the hallway doors have secure glass to meet BS7950/PAS 24 standards. Only Windows and doors tested to meet BS7950 are to be installed, and this involves the following tests;
5) Using secure doors/windows to relevant security ratings like PAS 24 and/or ensuring that building fabric systems are robustly constructed will minimise unintended access.
6) Lighting is required for each elevation with a door set that the public, visitors, or occupants of the building are expected to use.
7) 24-hour lighting (ideally using photoelectric cells) is designed for the building's communal areas.
8) The key fobs access the building and communal areas via video entry.

4.9 The layout of the 1st and mezzanine level to unit 1 overlooks Kilburn Place, which will improve the passive security of the area of the site.

4.10 The space should be structured to have clearly defined routes for all user types, natural forms of surveillance, and physical protection systems. Places encouraging activity and maintaining a managed/maintained environment will help prevent crime. With the back of the residential building overlooking pedestrian routes around the site due to the site constraints, it is believed the form of the building will help minimise crime.

4.11 The design team has avoided the specification of combustible materials in the building design, which will prevent the likelihood or impact of arson attacks.

4.12 Any cleaning equipment and/or fuels required on-site must always be kept secure in a locked area. Due to the site constrains, there is no waste storage area and waste will be stored within each dwelling and managed with regular collection.

5 Energy

Energy Modelling

5.1 Emissions from buildings account for 37% of total UK greenhouse gas emissions. These are made up of 45% direct emissions from burning fossil fuels for heat and 55% indirect emissions related to electricity use. Factors such as thermal insulation, air permeability, shading and glazing areas have been considered to reduce heating, cooling, and lighting demands.

5.2 The energy consultant developed an accurate energy model, considering factors like occupancy, weather scenarios, building services management, and any renewable and low carbon technologies contributions.

5.3 The Standard Assessment Procedure (SAP 10.2) methodology assesses dwellings' energy performance. The indicators of energy performance are Fabric Energy Efficiency (FEE), energy consumption per unit floor area, energy cost rating (the SAP rating), Environmental Impact rating based on CO_2 emissions (the EI rating) and Dwelling CO_2 Emission Rate (DER).

5.4 The Dwelling CO_2 Emission Rate is used to comply with building regulations. It equals the annual CO_2 emissions per unit floor area for space heating, water heating, ventilation, and lighting, less the emissions saved by energy generation technologies, expressed in $kgCO_2$ /m²/year.

5.5 The Baseline Energy Emission is calculated per GLA Energy Assessment Guidance (2018) Appendix 4. It uses the information of the building services equipment installed, which has produced a similar EPC rating to the published EPC rating.

Energy Metering and Electronic monitoring of energy usage

5.6 Energy meters with monitoring software are encouraged to be installed, which allows the building managers to record the occupational energy demand and identify times of day with higher energy demand. The building energy manager can use the data provided to identify potential energy savings by promoting energy efficiency to the building users.

External Lighting

5.7 External lighting often operates all night without saving energy or reducing light pollution. As the primary purpose of external lighting is building security, the lighting designers must demonstrate an energy-efficient exterior lighting design with low pollution levels and timed external lighting controls.

Low Carbon Design

5.8 An all-electric ASHP per dwelling with an underfloor heating system is proposed.

5.9 Photovoltaic (PV) Panels are designed to attach to the roof, and it is expected to produce 2,854kWh annually. That brings 0.3 tonnes of CO_2 yearly due to the implementation of PV panels in this development.

Energy Efficient Equipment

5.10 The client/building operator will select only energy efficiency "A" rated appliances.

5.11 The building materials and the operational sectors of this development have achieved a 'good' Green Guide rating with a long lifespan in terms of their durability and with most of the existing structures retaining and re-using on-site, and the materials have a good percentage of recyclability.

6 Transport

6.1 Sustainable travel is any form of transport that keeps damage to our environment and the future to a minimum. Motor vehicles create carbon emissions and other pollutants that damage the environment, add to global warming, and reduce air quality for residents. They can also cause more congestion, longer delays, increased parking problems and reduced road safety. London Borough of Camden Council encourages patterns and nodes of developments that reduce the need for private motor vehicle travel by improving accessibility to public transport and having travel plans that help reduce emissions by promoting alternatives to cars.

6.2 Such alternatives are:

- promote electric vehicle charging points;
- promote car sharing;
- encourage walking and cycling.

6.3 Due to site constraints, no on-site car parking will be available, and the dwellings are designed to encourage homeowners to use public transport options or walk and cycle.

Transport Assessment and Travel Plan

6.4 A Travel Plan is intended to promote sustainable and active travel. Its purpose is to deliver transport and transport-related benefits to the development and the wider community. As they include a package of actions designed to address the users' needs in that local area, effective but unpopular solutions, such as parking restrictions, can be combined with popular but expensive solutions.

6.5 The proposed travel plan ensures the users' increase and improves travel choices, cost savings, company image, staff health, and wellbeing.

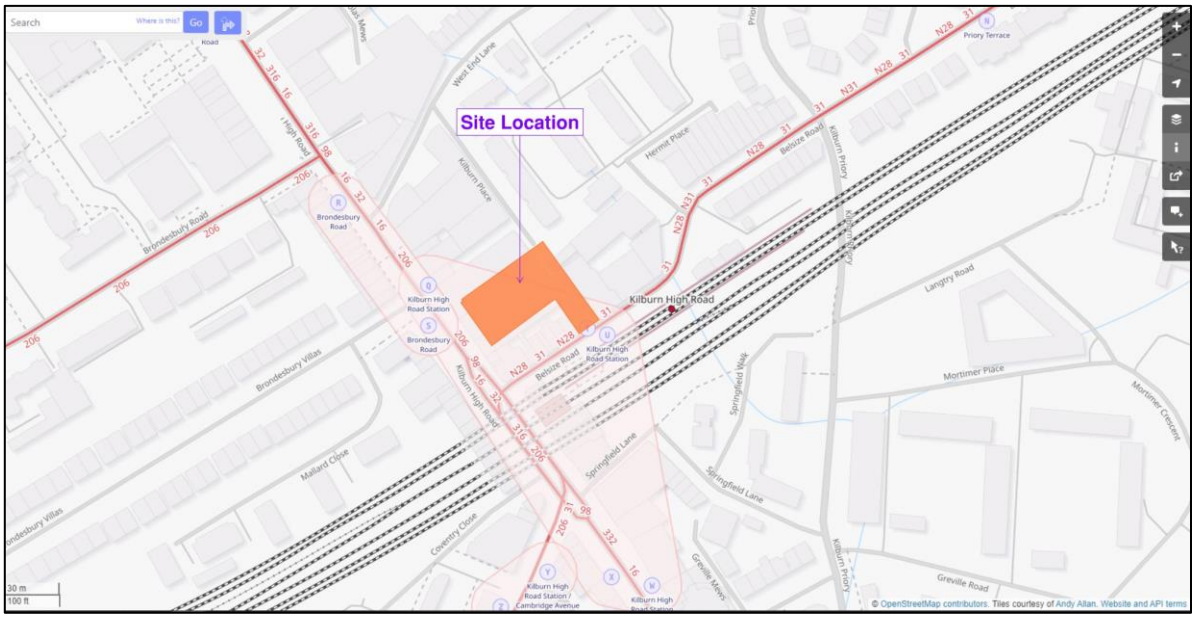


Figure 3 Transport route around the development site.

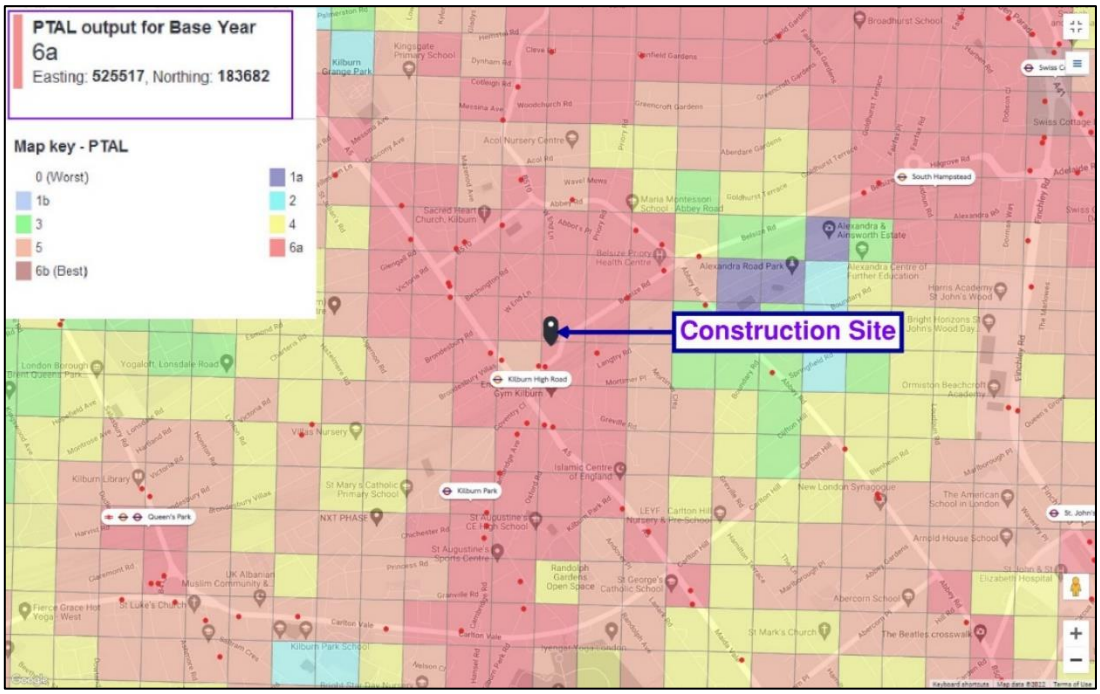


Figure 4 TFL Wed cat Report for the site.

6.6 The location provides a range of transport options, including the London Overground (50m from Kilburn High Road Overground Station), London Underground (Kilburn Park Underground Station) and excellent links to National Rail. The Public Transport Accessibility Level (PTAL) rating of 6a confirms that the site has good public transport with an Accessibility Index of 30.6. (https://tfl.gov.uk/info-for/urban-planning-and-construction/planning-with webcat/webcat?Input=NW6+4BT&PlaceHolderText=eg.+NW1+6XE+or+530273%2C+179613&type=Ptal &zoomLevel=15).

6.7 Kilburn High Road is within a minute's distance from the development, with a retail area containing many independent and larger national grocery stores (Tesco Express) and several café restaurants and fast-food outlets. Various public amenities and services are available within walking distance; in effect, the site is located in a busy and vibrant area and is eminently suitable for residential use.

6.8 The building will be upgraded to improve accessibility for wheelchair users, per the guidance in the Camden Local Plan.

6.9 As indicated above, a new platform lift is incorporated into the existing staircase. This will provide access to the entrance level on the first floor via the ground floor entrance lobby off Belsize Road.

6.10 The existing stepped access off Belsize Road will be adjusted to provide ramp access.

6.11 A refuge area for wheelchairs is located within the access corridor on the first floor.

7 Water

7.1 The UK has less water per person than most other European countries. London is drier than Istanbul, and the South East of England has less water available per person than Sudan and Syria.

7.2 Approved Document Part G of the Building Regulations in April 2010 sets a 'whole building' standard of 125 litres per person per day for domestic buildings. The building regulation limits internal water use to120 litres per person per day and an allowance of 5 litres per day for outdoor water use. The 'Water Efficiency Calculator for New Dwellings' calculates internal water use.

7.3 Water fitting will be specified with the following or similar rates to the target water consumption of 110 l/p/day for the residential aspect of the development. This development aims to reduce water consumption to less than 110 litres per person per day (including 5 litres for external water use), in line with the recommended target set out in the London Plan using water-efficient fittings and those listed below (Table 8).

Fitting	Fitting specification
WC	6/4 litres dual flush
Kitchen sink tap	6 litres per min
Washbasin tap	4 litres per min
Shower	8 litres per min
Bath	180 litres
Washing machine	8.17 litres/kg
Dishwasher	1.25 litres/place setting

Table 8 Recommended specification for sanitary fittings

7.4 This will be incorporated into the design and the sanitary ware/fittings selection at the detailed design stage to ensure that this target is achieved.

Water Monitoring

7.5 Sub-metering water consumption means that water consumption can be better accounted for. Large water consumers can be identified to encourage reducing water use where practical.

7.6 Each dwelling is fitted with pulsed output water meters to allow for the future installation of smart water meters.

7.7 Any water-consuming plant (water pressurisation of the communal heating system) will be fitted with sub-meters or have water monitoring equipment integral to the plant or area.

Water leak detection

7.8 A leak detection system can detect a significant leak in the mains water supply between the building and the utility water meter. This system will be:

- A permanent automated water leak detection system that alerts the building occupants to the leak OR an inbuilt automated diagnostic procedure for detecting leaks
- Activated when the flow of water passing through the water meter/data logger is at a flow rate above pre-set maximum for a pre-set time
- Able to identify different flows and, therefore, leakage rates
- Programmable to suit the owner/occupiers water consumption criteria
- Designed to avoid false alarms caused by the regular operation of the sizeable water-consuming plant

8 Materials

Environmental Impact

8.1 The environmental impact focuses on sustainable manufacturing, responsible resourcing, and end-of-life recycling. The issue focuses on construction product efficiency, environmental impact, responsible sourcing, and product durability.

8.2 The existing structure, including external walls, ground, and 1st-floor slabs, will be retained and re-used as part of the construction, which will greatly reduce the material-related carbon emission.

Responsible Resourcing

8.3 Most construction products involve lengthy and complex supply chains that result in various impacts locally and globally. These might include environmental (e.g., toxicity or biodiversity), economic (e.g., corruption) or social (e.g., slave labour, equality) issues and can occur during the extraction, processing, manufacturing, or supply chain stages. The increasing globalisation of supply chains increases the difficulty of tracing the supply chain and mitigating adverse impacts caused by it.

8.4 Where possible, building materials will be sourced locally to reduce the embodied carbon related to this site. A separate Whole life cycle carbon assessment report will be submitted as part of the planning application.

8.5 Credible certification schemes increase confidence in specifiers that risks are being minimised or avoided. Their use ensures that specifiers can demonstrate the responsible nature of their selection decisions. Examples of these are BES 6001 and ISO 14001.

8.6 Non-toxic materials will be used wherever possible, including the specification of products with a low VOC content in line with European testing standards.

8.7 All building materials will achieve high ratings on the BRE Green Guide to Specification. Materials will be specified to have a low embodied energy, considering the whole life cycle analysis.

Durability and Resourcing

8.8 The designers have considered the whole life cycle of the building's superstructure and complex landscaping options. The material selection will be reviewed and checked against the original design intent in the building superstructure life cycle analysis.

Material Efficiency

8.9 The proposed building materials are described within the design and access statement; the design intends to use (i) an insulated render system on a lightweight structural frame to the internal areas, (ii) buff brickwork to match the existing on Kilburn Place, and (iii) high-performance double-glazed aluminium windows. The roof will be a single-ply membrane roof with a green roof.

8.10 In selecting building materials, further consideration of the end-of-life dismantling of the building and the ability to recycle the materials used is given.

9 Waste

9.1 As waste treatment and disposal have both positive and negative impacts on the environment and climate, LBC on reducing waste in line with the waste management hierarchy, which is to:

- ***Reduce*** - Construction and operation of multi-residential
- ***Re-use*** - Review the recyclability of selected construction materials,
- ***Recycle waste*** - Provision of waste recycling facilities during construction and end-of-life dismantling.

Reducing Construction Waste:

9.2 The London Plan requires a commitment to reducing waste at the source, which requires that the main contractor implements waste prevention and reduction measures within all areas of their responsibility.

9.3 According to the London Plan, a Site Waste Management Plan (SWMP) will be implemented. The contractor will be contracted to reduce construction waste and ensure that at least 85% of the waste is recycled and not sent to a landfill site.

9.4 The waste produced during construction will be segregated and stored separately. The segregation of the materials as a minimum will include paper, glass, plastic, cardboard, metal, and other construction waste. Every effort will be made to re-use these materials on-site before sending them to recycling facilities or landfill.

9.5 The existing structure, including external walls, ground and 1st-floor slabs, and steel structure, will be retained and re-used as part of the construction, which will greatly reduce the on-site construction waste.

9.6 Domestic and Operational Waste - Provision of adequate refuse and recycling storage space, allowing the accessible collection to reduce household waste/operational waste in all developments.

Designing Out Waste

9.7 There are five fundamental principles used during the design process to reduce waste:

- Design for Re-use and Recovery;
- Design for Off-Site Construction;
- Design for Materials Optimisation;
- Plan for Waste Efficient Procurement; and
- Design for Deconstruction and Flexibility

9.8 Throughout the design process, consideration of the materials' quality to be specified and the quantities. Wherever possible, these will be reduced by specifying appropriate materials. Extra consideration is given to building material selection, which maximises the life expectancy of the building by selecting materials build-ups from the BRE Green Guide to specification.

Reducing Domestic and Operational Waste:

9.9 Domestic waste reduction enables the local authority to divert domestic waste from landfill or incineration. The design proposal includes external bin storage areas to separate waste into the various local authority waste collection schemes. London Borough of Camden requires the waste streams to be labelled:

- general waste
- recyclable materials
- food waste
- garden waste

9.10 Due to the site constraints, there is no waste storage area and waste will be stored within each dwelling and managed with regular collection.

Adaptation to Climate Change

9.11 The design team have considered and reviewed the various climate risks regarding the landscape, design and shape of the building and selection of building materials. This is to avoid costly alteration and modification to the proposed building resulting from the predictable impact of climate changes, such as hotter, drier summers and colder, wetted winters with a higher probability of extreme weather conditions.

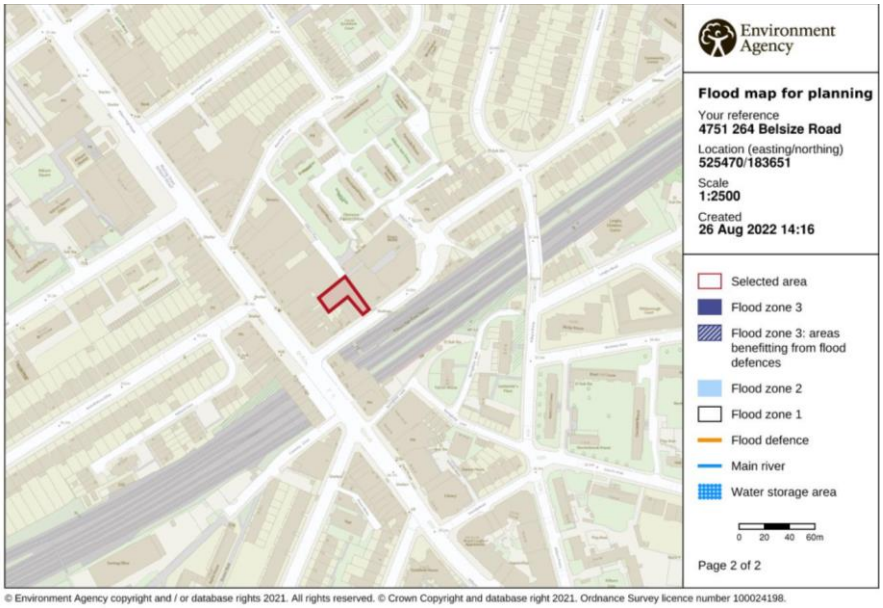
9.12 The design team have undertaken a systematic, structured approach to identify, evaluate, and manage the risk presented by climate change. The Climate Change Risk Assessment has included the following elements:

- Identifying the hazards (overheating and flooding)
- Eliminating the hazards as far as reasonably practicable.
- Reducing the risks from each danger as far as reasonably practicable.

9.13 The risk assessment process has helped the design team identify elements that may have reduced life expectancy or require increased capacity due to climate change. The outcome of this assessment has resulted in the designers including the following design elements:

- Windows will incorporate low-emissivity coatings to reduce solar gain.
- Solar shading from insetting of windows and balconies
- Inclusion of green roof.
- Air source heat pumps reduce energy-related carbon emissions and improve local air quality.
- Improved biodiversity and ecology of the private garden.
- The private garden and green roof create a micro-climate reducing summer urban heating
- The use of long-life and recyclable building materials

Flood risk



9.14 The development is in flood zone 1, an area with a low probability of flooding. There is limited planting associated with the development, and this will all be specified to be drought resistant, relying mainly on rainwater. As described above in water consumption, measures have been implemented to reduce potable water use internally. A green roof system can be considered a source control method for drainage/rainwater.

10 Land Use and Ecology

10.1 The development is considered low-moderate ecological value within the local context as there is an existing structure on the site. Measures will be taken during construction to minimise the impact on ecology by timing works appropriately, following best practice guidance, and through the soft landscape design. The development has a private garden per dwelling and a green roof structure. Mixed planting is recommended on the green roof.

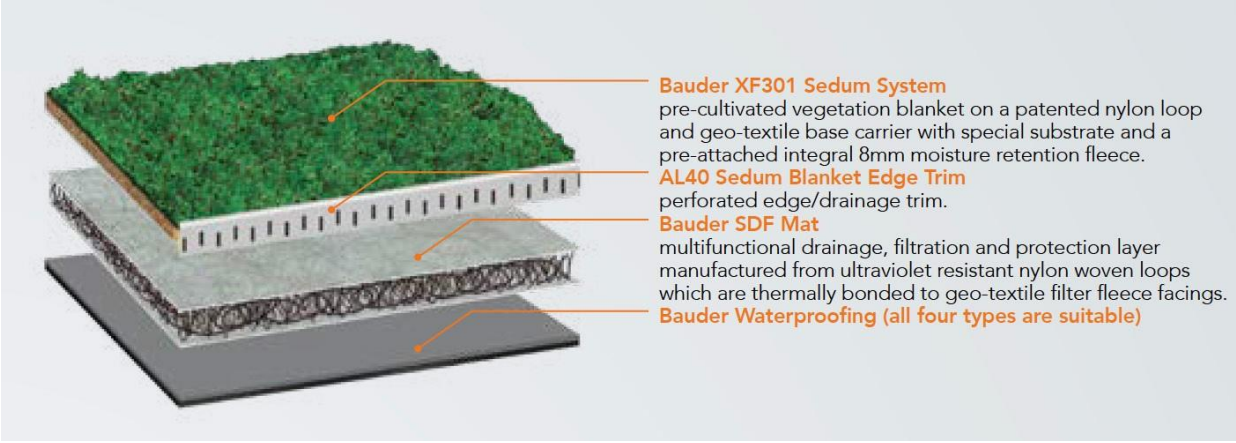
10.2 A green sedum roof is laid over the retained section, and biodiversity will be introduced into the rear back land site.

10.3 Green roofs to promote bio-diversity within the site are included at all levels: the roof over the rear (north) mezzanine, the roof over the central part of the living accommodation and the new roofs providing the link between the access corridor and entrance to each duplex. These replace the present monumental grey metal roofing with a sequence of green roofs to provide a much-improved outlook for the occupants of the surrounding buildings.

10.4 Extensive green roof systems generally provide a visual or biodiversity interest and are considered less suitable as an amenity or leisure space. They are generally designed to support plants with a lower maintenance requirement, e.g. sedums, grasses, mosses and some wildflower species. These planting types can survive on shallower substrate depths than other plants, requiring lower nutrient levels and little or no irrigation. When correctly designed and installed, irrigation is generally only required in the initial establishment phase and very rarely afterwards.

10.5 The green roof design enhances the local environment and improves public amenity areas. It also improves the relationship between the new accommodation and the neighbours

10.6 The urban heat island effect is reduced because the substrate of a green roof will absorb some of this heat. The natural evaporation of water from plants and soil helps cool and humidify the air, thus lowering the ambient air temperature. The local air quality is improved as the vegetation reduces gaseous pollutants and dust particles by removing a proportion of them from the immediate environment, effectively purifying the air. The construction of the roof and substrate utilises recycled or waste materials.



(a)

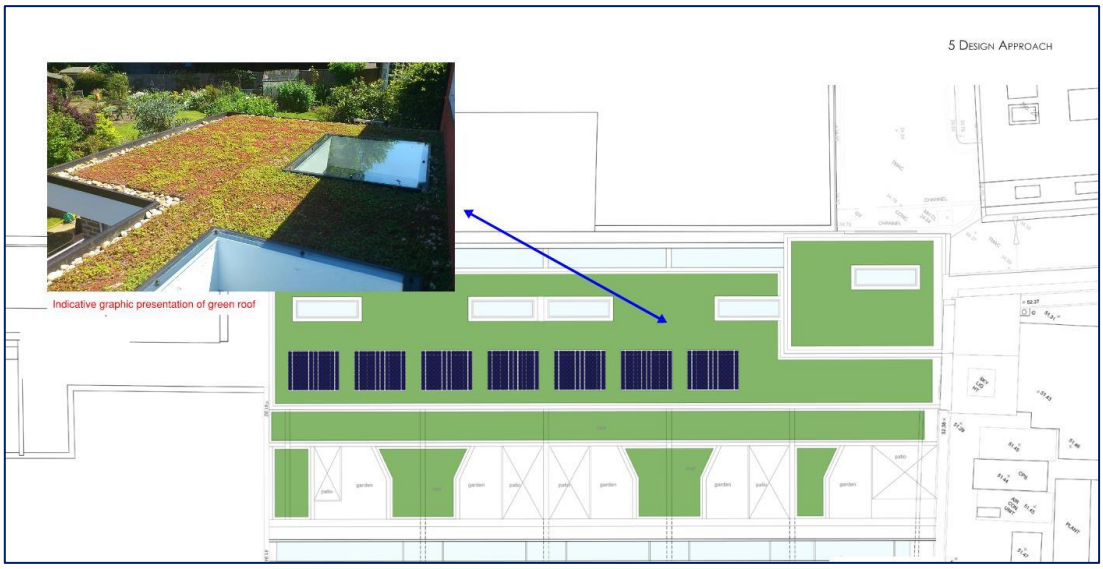


Figure 5 Proposed Green (biodiversity) area

10.7 Sedum green roofs are generally planted using pre-grown mats or blankets containing mixes of sedum species and/or planted with species of young sedum plug plants and/or sedum cuttings.

Surface water run-off and drainage

10.8 The drainage strategy adopted for this scheme has been to reduce discharge rates and sediment transfer from roof drainage to the receiving surface water sewer by using individual downpipes to a trapped gully. Screens will prevent the transfer of leaves and moss from the roof to the pipework system.

10.9 A simple maintenance regime should be applied to ensure that failure of the designed system does not occur by a blockage. Suppose a blockage or system failure occurs without repair. In that case, rainwater will seep from drainage outlets or at the lowest cover levels.

10.10 The inclusion of a green roof system can be considered as one method of source control for drainage:

- Water falling as rainfall onto a green roof is held within the pore spaces of the substrate.
- Water is taken up and used by the plants.
- Some of the water held within the plant is lost back to the atmosphere by evapotranspiration.
- Rain droplets are often trapped within the vegetation and can then evaporate back into the atmosphere.
- Water can be held within the drainage system of the green roof build-up.
- The drain water run-off rate is very much reduced due to the time it takes for the water to percolate through the green roof build-up and out via the drainage outlets. This, therefore, releases any excess water over a longer period enabling the terrestrial drainage systems to cope better

11 Pollution

Impacts of Refrigerants

11.1 The system will utilise the R33 or R134a refrigerant, providing a natural solution that delivers high operational efficiency whilst minimising the refrigerants' global warming potential. R33 and R134a refrigerants are a vital step toward a zero ODP, zero GWP, and efficient, safe, and non-toxic refrigerants.

Refrigerant Leak Detection

11.2 The heat pump controlling the temperature of the ambient loop uses R32 and will have a limited refrigerant charge. The larger communal heat pump with a refrigerant leak detection and pump-down system. These systems help safeguard against refrigerant levels exceeding permitted concentration levels and react effectively in the event of leaks.

Local Air Quality

11.3 Air pollution is associated with several adverse health impacts, particularly affecting the most vulnerable in society. The whole of Camden Borough has been declared an Air Quality Management Area (AQMA) for both NO2 (Nitrogen Dioxide) and PM10 (Particulate Matter). Camden is also working to assess and address PM2.5 (the smallest fraction of particulate); despite Camden meeting EU limit values for PM2.5, research suggests that particulates of this size have the worst health impacts.

11.4 Air quality is particularly severe along major roads and railway lines through the borough. This site is close distance to a major road and TFL railway line. The adjacent building shields this proposed development from the slightly-more polluted street air.

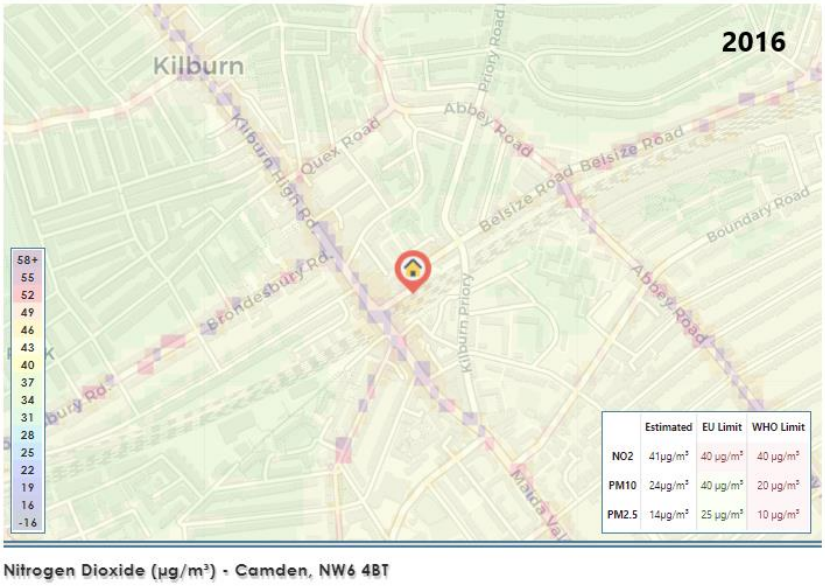


Figure 6 Nitrogen Dioxide (https://londonair.org.uk/map-maker/)

11.5 This map was used with permission from The Greater London Authority and Transport for London, who fund, develop, and maintain the London Atmospheric Emissions Inventory. For more information, please visit https://data.london.gov.uk/.

11.6 Figure 6 shows the annual mean pollution for NO2, PM10 and PM2.5 for NW6 4BT. The data is based on the most recent year for which an accurate model is available, 2016, as the latest LAEI 2019 forecast data isn't available as referenced to the LAEI 2019 Summary Note Final https://airdrive-secure.s3-eu-west-

1.amazonaws.com/london/dataset/london-atmospheric-emissions-inventory--laei--2019/2022-02-03T13%3A13%3A03/LAEI%202019%20Summary%20Note%20FINAL%20V2.pdf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAJJDIMAIVZJDICKHA%2F20220902%2Feu-west-1%2Fs3%2Faws4_request&X-Amz-Date=20220902T101854Z&X-Amz-Expires=300&X-Amz-Signature=4dafda848c2e1ee49caae775a19df7bd8a9f3f7f05e02e31a3924719c9baffae&X-Amz-SignedHeaders=host).

LAEI 2019 Forecast Data

The LAEI 2019 will also include projections for the years 2025 and 2030, with concentration maps and emissions data for NO_2, PM_{10} and $PM_{2.5}$. This dataset will be available in spring 2022. The data will be available on the London Data Store once finalised.

Quotation from LAEI 2019 Summary Note FINAL

	Estimated	EU Limit	WHO Limit	
NO2	41µg/m³	40µg/m³	40µg/m³	Fail (WHO)
PM10	24µg/m³	40µg/m³	20µg/m³	Fail (WHO)
PM2.5	14µg/m³	25µg/m³	10µg/m³	Fail (WHO)

Table 9 Annual Air Quality Limits

11.7 The site passes the EU airborne particle targets (PM10 & PM2.5). However, the site fails on WHO annual mean Nitrogen Dioxide targets and the WHO airborne particle targets. The airborne particles are mainly caused by a road containing a bus route and railway line.

11.8 Kilburn high road and Belsize Road are on bus routes that increase NOx and particulate emissions that generally dissipate above 5m. The mechanical ventilation will take air from the Kilburn Place side. The adjacent building shields this proposed development from the slightly-more polluted street air.

11.9 All Air Quality parameters are within annual target limits. The prediction is that air quality improves because of planning policies that include limiting the application of combustion heating for larger developments, restriction on personal car ownership by reducing the number of car parking spaces per development, increasing the ultra-low emission zone within the London Circular Road, and general promotion of improved public transport and cycle lanes, and also use of green roof.

11.10 It is widely recognised that green roofs play a positive role in the improvement of air quality. In photosynthesis, plants absorb carbon dioxide from the atmosphere and release oxygen.

11.11 The construction site air quality plan outlines how dust emissions from demolition and construction must be controlled and delivery vehicle movements reduced.

11.12 The air quality data is collected at the street level based on 2016, the ultra-carbon emission zone in place by GLA since then, and the site is distant from the main street and shielded from the main street because of adjacent buildings. Those factors, including the inclusion of the proposed green roof, could indicate the air quality of this site has a good level of air quality than the level indicated by the air quality map

12 Conclusion

12.1 There is no requirement for a formal sustainable assessment for residential buildings since the code for sustainable homes has broadly been adopted. Camden Council planning documents refer to BRE Home Quality Mark, Passivhaus, or other equivalent standards to demonstrate sustainable residential design. Due to the scale of the project and site constraints, it is not feasible to conduct an HQM assessment for this proposed development.

12.2 This sustainability report follows the BRE Home Quality Mark that shares similar standards to the BREEAM rating method to cover the following aspects of HQM for this Development:

Sustainable design and management

12.3 All possible passive design measures have been considered, including efficient building fabric, well-insulated walls and highly efficient glazing, efficient systems (ASHP), green roof, and renewable/low carbon energy sources like PV to maximise carbon savings for the site.

12.4 The considerate contractor scheme is recommended for implementation on the site during the construction of the development.

Health and wellbeing

12.5 The indoor air quality will be maintained through mechanical ventilation with heat recovery (MVHR) using a combination of carbon filters and natural ventilation by opening the windows.

12.6 Thermal modelling has been carried out to inform the building design to provide a comfortable thermal environment that considers current climatic conditions and projected climate change scenario conditions.

12.7 Daylight simulation indicates all dwellings achieve the average daylight factor of 0.90.

12.8 The design team will adopt "Secured by Design security" measures to ensure best-practice guidelines are followed during design development.

Energy

12.9 An all-electric Air source heat pump (ASHP) per dwelling with an underfloor heating system is proposed.

12.10 Photovoltaic (PV) panels are designed to be roof-mounted, and it is expected to produce 2,854kWh of green electricity annually with 4kWp. That brings 0.3 tonnes of CO2 yearly due to the use of PV panels in this development.

12.11 Energy meters with monitoring software are encouraged to be installed. All internal/external light fittings will be provided with low-energy light fittings (LED) and luminous efficiency greater than 35lm/W.

Transport

12.12 The location provides a range of transport options, including the London Overground (50m from Kilburn High Road Overground Station), London Underground (Kilburn Park Underground Station) and excellent links to National Rail. The Public Transport Accessibility Level (PTAL) rating of 6a confirms that the site has good public transport with an Accessibility Index of 30.6.

Water

12.13 This development aims to reduce water consumption to less than 110 litres per person per day (including 5 litres for external water use), in line with the recommended target set out in the London Plan using water-efficient fittings. Each dwelling is fitted with pulsed output water meters to allow for the future installation of smart water meters.

Materials

12.14 Materials will be specified to reduce the embodied carbon of the development wherever possible. Responsible sourcing will also be pursued. All timber used on-site during the construction phase and within the building will be from legal sources. Where possible, materials will be sourced locally. Sourcing of other materials will include products where the manufacturer employs an environmental management system such as ISO 14001 or BES 600.

12.15 Non-toxic materials will be used wherever possible, including the specification of products with a low VOC content in line with European testing standards.

12.16 All the building elements will achieve high ratings on the BRE Green Guide to Specification. Materials will be specified to have a low embodied energy, considering the whole life cycle analysis.

Waste management

12.17 Construction site waste will be managed in such a way as to reduce the amount of waste produced as much as possible, and the waste hierarchy will be followed. Regular waste and recycling bins will be provided for waste separation to facilitate recycling. In addition, at least 85% of waste that does arise will be recycled using an external waste contractor.

Noise

12.18 The development will comply with Building Regulations Part E, providing good sound insulation. All windows are specified as high-efficiency double glazing to minimise noise transmission between the property and the surrounding area.

Air quality

12.19 The construction site will be managed so that the environmental impact is minimised. This includes following best practice policies for dust pollution by using dust sheets, covering skips and damping down where appropriate.

12.20 Insulating materials and heating systems will be specified to keep pollutants to a minimum. Insulation will have a low Global Warming Potential (GWP). Including a green roof will improve the air quality of the site.

Landscape and ecology

12.21 The development is considered low-moderate ecological value within the local context as there is an existing structure on the site. Measures will be taken during construction to minimise the impact on ecology by timing works appropriately, following best practice guidance, and through the soft landscape design.

12.22 The development has a private garden per dwelling and a green roof structure. Mixed planting is recommended on the green roof. A green sedum roof is laid over the retained section, and biodiversity will be introduced into the rear back land site. The green roof design enhances the local environment and improves public amenity areas. It also improves the relationship between the new accommodation and the neighbours.

12.23 The development is in flood zone 1, an area with a low probability of flooding. The inclusion of a green roof releases any excess water over a longer period, enabling the terrestrial drainage systems to cope better.

Appendix-Site Pedestrian Accesses Route