William Carter Architects

Energy and Sustainability Statement

Proposal for the demolition of 118 Malden road to erect four new flats

22 November 2023

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1 Executive Summary

This Energy and Sustainability Statement has been prepared by Watt Energy on behalf of William Carter Architects to support a planning application for the development of 118 Malden Road. The statement specifically addresses the following London Borough of Camden planning policies, as stipulated in the London Borough of Camden Council's Local Plan 2016 and The London Plan 2021:

- CC1 – Climate Change Mitigation
- CC2 – Adapting to Climate Change
- SI 2 – Minimising Greenhouse Gas Emissions
- SI 3 – Energy Infrastructure
- SI 4 – Managing Heat Risk

The statement details how the development will incorporate sustainable design and resource efficiency in line with the Energy Hierarchy, so to meet the policy requirements and council targets whilst reducing its overall environmental impact.

In relation to the planning documents and policies outlined above, the development is required to achieve a status of Net Zero Carbon (NZC) whilst also achieving a 10% reduction in carbon emissions over the Part L 2013 baseline solely through efficient design measures, calculated at the Be Lean stage.

To achieve this compliance, the development has been designed with a holistic low energy design concept involving a fabric first approach. The U-values, design air permeability and ventilation targets all aspire to achieve and exceed Part L 2022 standards along with the consideration and application of low zero carbon renewable technologies.

Following the LZC feasibility assessment, it is proposed that the development will benefit from a Dimplex Edel Air Source Heat Pump Hot Water unit to satisfy the hot water demands.

As a result of the above the predicted reduction in CO_2 over Part L 2022 of the Building Regulations solely through efficient design measures is 10.0%, whilst the site wide CO_2 reductions can be summarised as:

- 70.3% with SAP 10.2 carbon factors

This statement also examines how the design, specification and characteristics of the proposal will contribute to sustainability and meet the relevant objectives outlined within the National Planning Policy Framework (NPPF) 2021, in addition to the London Borough of Camden Council's approved climate change action plans and local plan planning policies outlined above. The sustainability measures assessed included:

- Flood Risk Zone
- Green and Blue Infrastructure
- Sustainable Drainage Systems (SUDs)

- Biodiversity / Ecology
- Internal Water Efficiency
- Waste Management
- Materials
- Pollution Control
- Health and Wellbeing
- Sustainable Transport

The development therefore complies with all London Borough of Camden Council's policy requirements relating to creating a sustainable development.

In relation to the planning target centred around carbon emission reduction, the proposed development is achieving a site wide 10.0% reduction through efficient design measures and a 70.3% reduction overall, with an offset payment of £1697.40. Therefore complying with The London Plan 2021 and London Borough of Camden Council's planning targets.

2 Planning Statement

The following report relates to the proposed development at 118 Malden Road, London NW5 4BY.

2.1 The Site and Proposed Development

The site is northwest of the centre of London, within Camden. The site occupies approximately 0.0117 hectares of land. A plan, with the site's extents denoted by the red outline seen in Figure 1 (shown later in this subsection).

The site is bounded to the southeast by Malden Road, Gilden crescent to the north and east, Queens crescent to the south and is adjacent o existing residential and commercial units. The site is currently occupied by an eixtsing three storey building that is to be demolished and partially retained.

The proposal is for a residential development consisting of four new build apartments. These flats will be two bedroom apartments (use class C3). Also provided will be associated ancillary facilities including a refuse/recycling store.

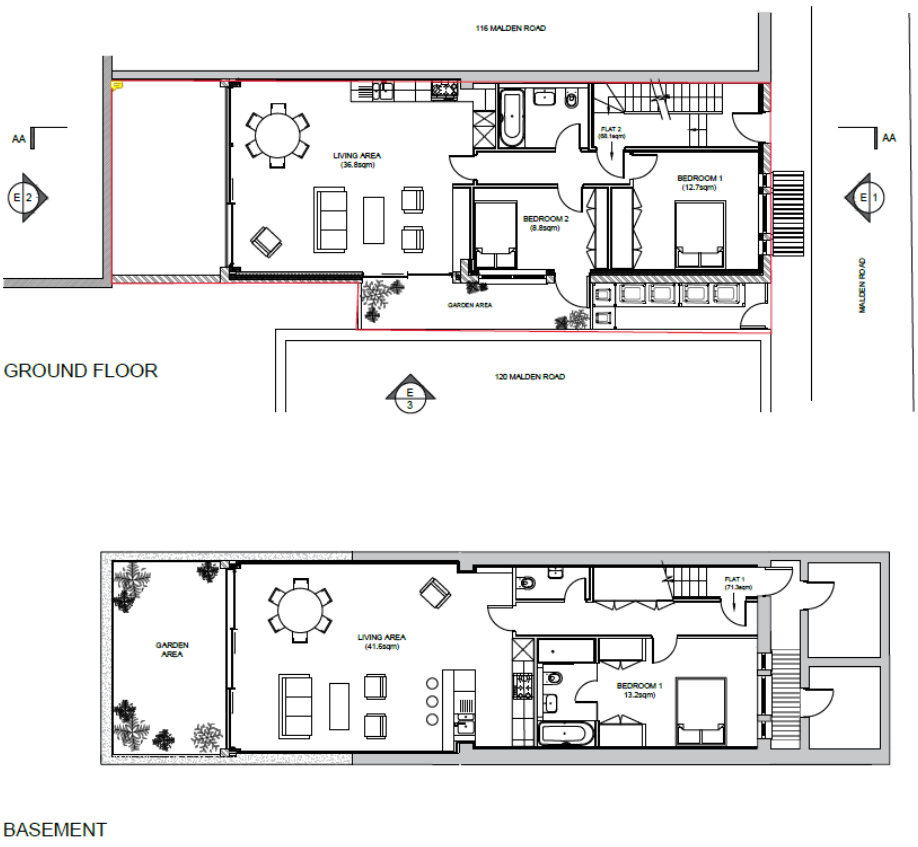


Figure 1: Basement and Ground Floor Plan

2.2 Relevant Policies and Guidance

2.2.1 Local Planning Policy

2.2.1.1 London Borough of Camden Local Plan

This report is a resultant production in response to London Borough of Camden Council's Local Plan 2016 and The London Plan 2021, and specifically deals with planning policies CC1, CC2 and SI2, SI3 and SI4, covering Climate Change and Sustainability.

Policy CC1

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 feasible 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.

Policy CC2

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::

a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water run-off through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

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.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. expecting developments (conversions/extensions) of 500 sqm of residential floorspace or above or five or more dwellings to achieve “excellent” in BREEAM domestic refurbishment; and
h. 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.

2.2.1.2 The London Plan 2021

Policy SI 2

Policy SI 2 Minimising greenhouse gas emissions

A Major development should be net zero-carbon.[155] This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

1) be lean: use less energy and manage demand during operation

2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly

3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site

4) be seen: monitor, verify and report on energy performance.

B Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C A minimum on-site reduction of at least 35 per cent beyond Building Regulations[156] is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

1) through a cash in lieu contribution to the borough's carbon offset fund, or

2) off-site provided that an alternative proposal is identified and delivery is certain.

D Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

F 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 3

Policy SI 3 Energy infrastructure

A Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.

B Energy masterplans should be developed for large-scale development locations (such as those outlined in Part A and other opportunities) which establish the most effective energy supply options. Energy masterplans should identify:

1) major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)

2) heat loads from existing buildings that can be connected to future phases of a heat network

3) major heat supply plant including opportunities to utilise heat from energy from waste plants

4) secondary heat sources, including both environmental and waste heat

5) opportunities for low and ambient temperature heat networks

6) possible land for energy centres and/or energy storage

7) possible heating and cooling network routes

8) opportunities for futureproofing utility infrastructure networks to minimise the impact from road works

9) infrastructure and land requirements for electricity and gas supplies

10) implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector

11) opportunities to maximise renewable electricity generation and incorporate demand-side response measures.

C Development Plans should:

1) identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure

2) identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and inter-connecting existing networks as well as establishing new networks.

D Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

1) the heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

a) connect to local existing or planned heat networks

b) use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)

c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)

d) use ultra-low NOx gas boilers

2) CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality

3) where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.

E) Heat networks should achieve good practice design and specification standards for primary, secondary and tertiary systems comparable to those set out in the CIBSE/ADE Code of Practice CP1 or equivalent.

Policy SI 4

Policy SI 4 Managing heat risk

A Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

B Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure

2) minimise internal heat generation through energy efficient design

3) manage the heat within the building through exposed internal thermal mass and high ceilings

4) provide passive ventilation

5) provide mechanical ventilation

6) provide active cooling systems.

2.2.2 National Planning Policy

The NPPF (January 2021) sets out the Government's planning policies for England and how these are expected to be applied. The overall emphasis of the NPPF is to reiterate the Government's key objectives, including securing sustainable development.

The NPPF defines the purpose of the planning system as being to contribute to the achievement of sustainable development. It explains at Paragraph 8 that there are three dimensions to sustainable development. These are economic, social and environmental and should be pursued simultaneously through the planning system.

Paragraph 10 states that at the heart of the Framework is a presumption in favour of sustainable development.

2.3 Sustainable Design Strategy

2.3.1 Energy and Carbon Emissions

Building Services Strategy

In response to the policy requirements and climate change plan targets set out in section 2.2, developments should aim to assist and achieve the following carbon reduction targets:

1. Achieve a minimum of 10% CO_2 reduction over the Part L 2013 baseline, solely through efficient design measures (Be Lean)
2. Achieve a Net Zero Carbon (NZC) classification through 100% CO_2 emission reduction
    a. If this is not possible, then a minimum 35% CO_2 reduction with the remaining emissions offset through a payment

To achieve the most accurate calculations and estimates, the proposed units have been modelled using *SAP 10.2* the governments Standard Assessment Procedure for residential dwellings.

The proposed strategy for minimising energy use and carbon emissions is based on the energy hierarchy described in CIBSE Guide F 2012 (Energy efficiency in buildings). The energy hierarchy has been adopted for the development to ensure that the correct approach to design is taken to promote an energy-efficient low carbon solution (see figure 2). This has ensured that the benefits of effective methods of energy use reduction have been maximised first. The approach adopted is as follows:

Fig 2: Energy Hierarchy

Minimise energy demand – Implement passive design measures and optimise the building envelope in terms of orientation, air tightness, and insulation. For example, the proposal is targeting a low carbon classification through a holistic low energy design concept as it will be designed with a fabric first approach whereby Passive House design standards are aspired to for all fabric U-values and air permeability targets.

Meet demands efficiently – Specification of energy efficient decentralised plant, heating, ventilation, lighting, and system controls to facilitate efficient operation.

Particular attention is being paid to the wellbeing of occupants. The ventilation strategy has been developed to minimise noise ingress from the proposed location as far as possible while minimising the risk of overheating.

Additional Renewable Energy Measures

Opportunities for incorporating low and zero carbon technologies (LZCT) have been considered for this development. The viability of several separate technologies was examined in a LZCT study (see section 3) which helped to identify potential opportunities for the inclusion of ASHPHW units.

Efficient and Sustainable Design Measures

In line with the above Sustainable Design Strategy, the following Energy Efficient design measures are specified.

- High levels of insulation throughout with minimal thermal bridges
- Passive solar gains and internal heat sources
- Excellent level of airtightness
- Good indoor air quality by openable windows

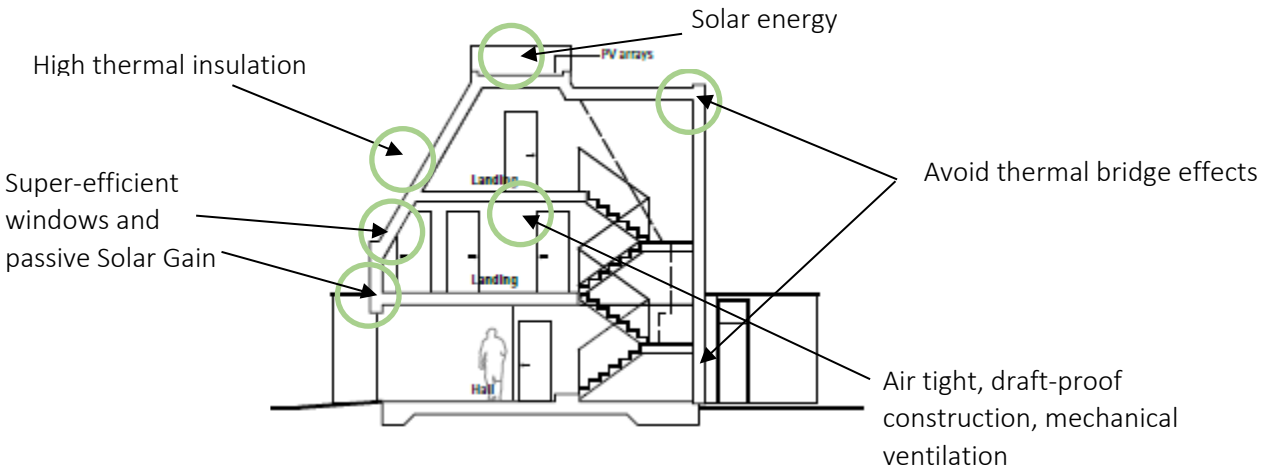


Fig 3. Efficient Design Measure examples

The Proposed specifications and key energy efficient design measures are as follows:

Residential Units:

- Ground/Basement floor U-values of 0.12 W/m²K
- External Wall U-values of 0.18 W/m²K
- Flat Roof U-values of 0.10 W/m²K
- Pitched Roof U-values of 0.12 W/m²K
- Sloped Roof U-values of 0.12 W/m²K
- Low Double Glazed Window U-values of 1.2 W/m²K
- 100% low energy lighting throughout
- 100% efficient electric panel heaters to each flat
- MVHR – Vent Axia Sentinel Kinetic FH to each flat
- Air Permeability Rate of 3m³/hm² in all houses

2.3.2 Choice and Impact of Renewable Technology

All reasonable technologies were investigated for their suitability to the site and development; please refer to section 3 for details.

In addition to energy efficiency measures, it is proposed that the development will feature the following Low/Zero carbon Technologies:

- Dimplex Edel ASHPHW units located in the store cupboard to each flat, situated next to the external wall

The above LZC contribution has provided an 65.9% reduction in CO2 following Energy Efficiency Measures.

- Energy Saving from onsite LZC Technologies = 7637.3 kWh/Yr
- CO2 Saving from onsite LZC Technologies = 1820.8 kgCO2/Yr

2.3.3 Energy and CO_2 Reduction Summary

A summary of all stages of the energy demand assessment from baseline figures to final carbon reduction are shown in Figures 1 & 2 below:

	SAP 10.2
Summary of CO2 Emission Reductions	**Total CO2 emissions (kgCO2/year)**
Carbon Factors (Gas / Electric)	**0.210 / 0.136**
Baseline emissions	3171.9
Improved emissions (after application of energy efficiency measures) - residual emissions	2763.8
Improved emissions (after incorporation of renewable energy technology) % CO2 displaced in total	943.0
% CO2 displaced in total	70.3%
% CO2 displaced by energy efficiency measures	12.9%
% CO2 displaced by renewable energy	65.9%

Table 1: Summary of CO2 Reductions

	Energy demand (kWh pa)	Energy saving achieved (%)	Regulated CO_2 emissions (kg pa)	Saving achieved on residual CO_2 emissions (%)
Building Regulations Part L compliance ("Baseline" energy demand & emissions)	13983.1		3171.9	
Proposed scheme after energy efficiency measures (" Residual" energy demand & emissions)	14571.3	-4.2%	2763.8	12.9%
Proposed scheme after on-site renewables	6934.0	52.4%	943.0	65.9%
Proposed scheme offset for financial contribution or other "allowable solution"			0	0
Total savings on residual emissions				**65.9%**

Table 2. Total Energy and Carbon Emissions Savings Based on SAP 9.0 Carbon Factors

For a full Breakdown of the figures and calculations please see Appendix A – Energy Demand Assessment Spreadsheet.

Baseline energy demand

'Standard Assessment Procedure - SAP 2012' was used to produce example SAP reports to generate the figures used within the calculations.

Baseline energy demand (kWh pa)	13983.1
Regulated emissions (kg pa)	3171.9

Be Lean stage

The following table demonstrates how the development achieves the reduction in carbon dioxide emissions from energy efficiency measures.

Energy savings from energy efficiency measures (kWh pa)	-
Emission savings from energy efficiency measures (kg pa)	408.0
Total regulated emissions after CHP savings and energy efficiency measures (kg pa) ("residual emissions")	2763.8

Be Clean stage

The heating and cooling hierarchy has been applied to the design process of the development. It has resulted in large focus on energy efficiency measures and as can be seen in Figure 1.

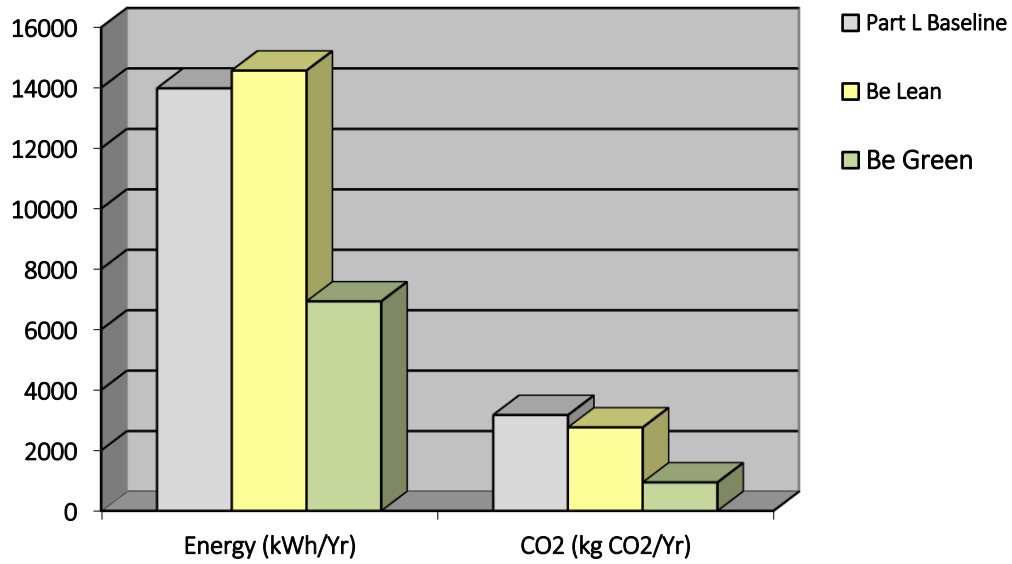
Energy savings from the use of CHP systems (kWh pa)	-
Emission savings from the use of CHP systems (kg pa)	-
Total regulated emissions after CHP savings (kg pa)	2763.8

On-site renewables

The following table demonstrates how the development achieves the reduction in carbon dioxide emissions from LZC technologies.

Energy saving from the use of renewables (kWh)	7637.3
Saving on residual emissions from the use of renewables (kg)	1820.8
Saving on residual emissions from the use of renewables (%)	65.9%

The chart below illustrates the improvements over the Part L Compliant Baseline:



Carbon Shortfall Offset Calculation

After the application of energy efficient design measures and renewable technologies, it has been calculated that the proposed development will still be producing 943 kgCO2 per year. Therefore this shortfall must be offset using Camden Council's cash contribution amount; £95/tonne CO2 (calculated over a 30 year period).

943kgCO2 = 0.943tonnes CO2 therefore:

(0.943 x 30 years) x £60 = £1697.40

2.4 Adaptation to Climate Change

In addition to the primary building design and fabric, many other issues that will influence creating a Sustainable Development, including flood prevention, material use, waste minimisation and transport.

All the sections of creating a sustainable development should be taken into consideration from the start of the development and promoted throughout the building construction on site in order to maximise their benefits. Additionally, features which enable more efficient usage should also be specified to encourage the building users to maintain efficient use once construction has been completed.

2.4.1 Cooling Hierarchy and Overheating

In addition to following the energy hierarchy, the development has been designed in accordance with the cooling hierarchy to reduce the potential for overheating and reliance on air-conditioning systems. Therefore, the development abides by the following principles to reduce the overheating potential and the need for any air conditioning systems.

London Plan Cooling Hierarchy	Proposed Design Measures	Priority
Minimise internal heat generation through energy efficient design	Limiting heat losses through good design and thermally efficient build-ups.	Highest
Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls	Use of thermally efficient windows with low-g values to minimise heat losses but also control amount of heat entering building.	
Manage the heat within the building through exposed internal thermal mass and high ceilings	The development is expected to have a medium thermal mass to reduce risk of overheating.	
Passive ventilation	Internal doors left open to maximise cross ventilation and reduce risk of overheating.	
Mechanical ventilation	No mechanical ventilation proposed to further promote natural ventilation.	
Active cooling systems (ensuring they are the lowest carbon options)	As above.	Lowest

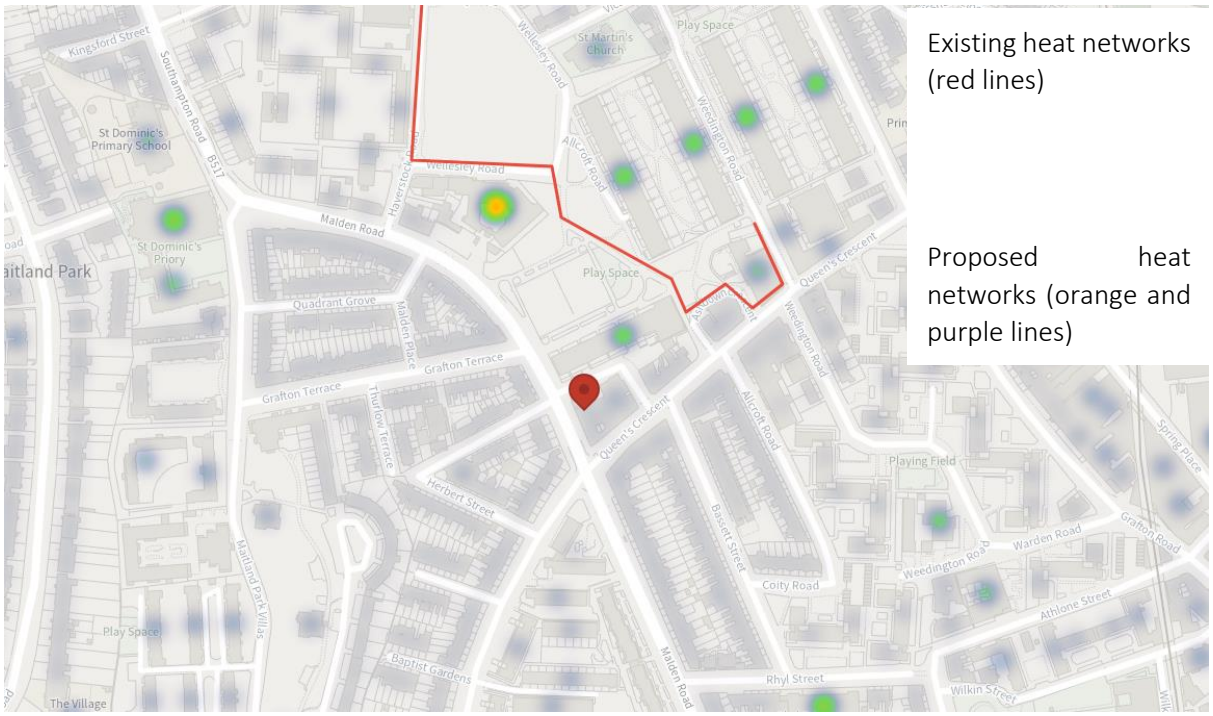
By following the energy hierarchy, the proposed dwelling has automatically followed the cooling hierarchy as design measures have been prioritised, with this also reducing the potential overheating of the development by naturally managing the minimising of heat losses with heat gains.

2.4.2 Clean Energy Supply

In addition to efficient design measures, systems providing a 'clean energy supply' were also assessed to potentially achieve greater carbon savings.

District Heat networks

The London Heat Map was reviewed to determine the potential of connecting to an existing heat network.



The red marker on the above image represents the location of the development. Red lines would portray any existing district heating networks that could be connected to, whilst orange and purple lines would represent proposed networks. Additionally, the patches of green red, along the colour spectrum, outlines the heat demands in all areas. It has been deemed unfeasible for the site to be connected to a district network.

Combined Heat and Power (CHP)

CHP is an efficient method for generating on-site electricity as well as heating. The heat generated from the gas engine of the system is also used to produce hot water for domestic hot water; this has the subsequent advantage of reduced fuel costs and carbon emissions. Therefore this would be a particularly effective way of reducing the developments carbon emissions in line with the council's requirements.

However, according to GLA guidance March 2016, for small-medium residential led, mixed use developments:

'It is not economic to install CHP… due to the small landlord electricity demand, CHP installed to meet the base heat load would require the export of electricity to the grid. However, the administrative burden of managing CHP electricity sales at this small scale where energy service companies (ESCOs) are generally not active, and the low unit price available for small volumes of exported CHP electricity, means it is generally uneconomic for developers to pursue. This can lead to CHP being installed but not operated.'

The guidance then goes on to say that if the site is classed as 'small-medium' and there are no connectable or planned heat networks the development would not be expected to install a site heat network and individual/dwelling specific technologies would be acceptable (such as individual gas boilers).

As a result of the above reasoning, CHP is not deemed financially viable and is therefore not proposed for the site.

2.4.3 Flood Risk Zone

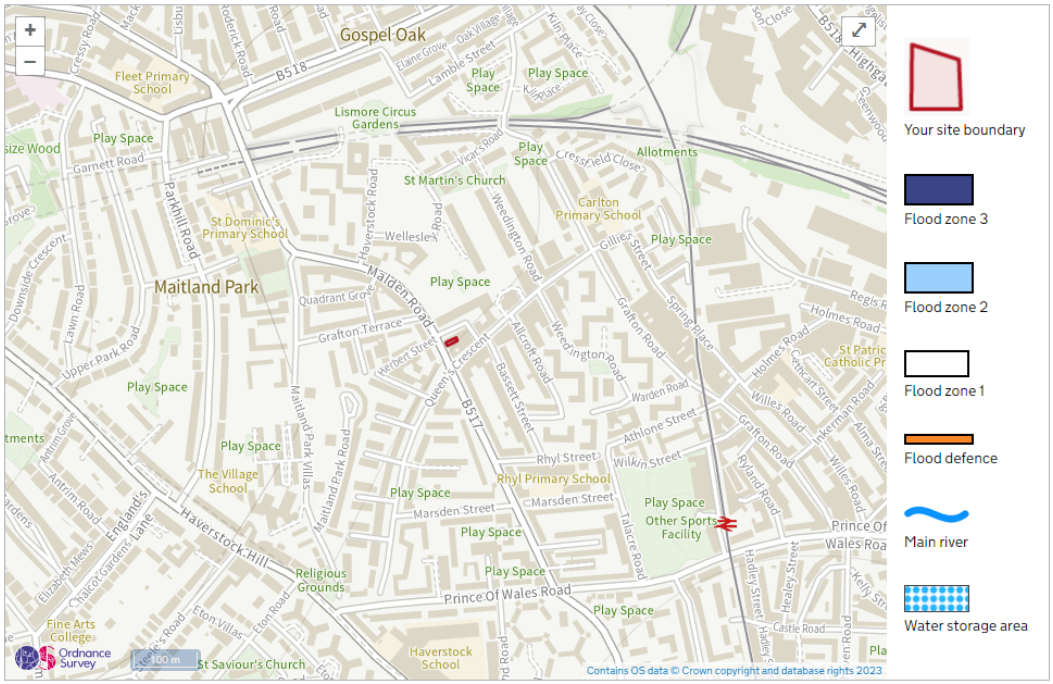


Fig 4: Flood Risk Map

The above map and snippet have been taken from a Government licences flood risk map for Camden. It can be seen that the site is just located within flood risk zone 1 and therefore has minimal to no risk of flooding.

2.4.4 Green Blue Infrastructure

2.4.4.1 Sustainable Drainage Systems (SUDs)

Even though it has been shown that the proposed scheme is located on a site with a low to zero flood risk, a drainage strategy assessment should be undertaken, by a suitably qualified professional, to assess the feasibility of introducing on-site SUDs measures, that will reduce surface water run-off and any flood risks associated.

2.4.4.2 Biodiversity

Similarly, to the previous section on SUDs, there could be adverse impacts on the surrounding ecology as well potential for the enhancement. Therefore, an ecology report should be produced, by a suitably qualified professional, in order to ensure that any existing ecology on or near the site is adequately protected and to determine the possibility of new habitat creation, planting schemes, green wall areas.

2.4.5 Internal Water Efficiency

Part G of the Building Regulations requires all new dwellings to have an internal water consumption of no greater than 110 litres / person / day, unless specified to be less. Therefore, fittings proposed should have low flow rates, capacities, effective flush volumes etc. Example targets for these to achieve the required internal consumption are as follows:

Appliance	Unit of measure	Amount (litres)
WC (Dual flush)	Full flush volume	4
WC (Dual flush)	Part flush volume	2.6
Taps (excluding kitchen)	Flow rate l/min	5
Kitchen taps	Flow rate l/min	6
Bath	Capacity to Overflow	170
Shower	Flow rate l/min	8
Washing Machine	Litres / kg dry load	8.17
Dishwasher	Litres / place setting	1.25

Table 4. Internal Water Efficiency Flow Rates

The above rates will achieve a total internal water consumption of 106.31 with a bath present and 98.25 with only a shower present.

The specifying of 'A' rated appliances should be prioritised where possible.

2.4.6 Waste Management

2.4.6.1 Occupational Waste

Camden Council encourages all new developments to incorporate a waste management strategy into the build at the earliest stage possible.

2.4.6.2 Construction Waste

A target of at least 90% of waste generated on site, throughout the construction stage of the development, to be diverted from landfill' will be included as part of a Construction Environmental Management Plan (CEMP) to be agreed with CC.

The proposal will also endeavour to maximise the use of recycled materials on site, whereby further promoting the minimising of waste production.

2.4.7 Materials

The construction of new buildings and building elements has a large environmental impact in terms of both, energy, and embodied carbon of new materials. Therefore, Camden Council promotes the prioritising of environmentally friendly materials, where possible, and encourages the use of recycled building materials. This information should also be incorporated into the SWMP mentioned in the previous subsection (Waste Management) as a means of promoting the re-using and recycling of materials.

Where new materials are to be used, careful consideration of their environmental impact should be taken. This can be achieved by ensuring that only materials that score well under The Green Guide to Specification. This useful online tool can be used as a reference that provides guidance on the relative environmental impacts for a wide range of different building specifications. The BRE's Environmental Profile Methodology determines the Life Cycle Assessment (LCA) of materials, which is what the Guide's specifications are based on.

In order to take full advantage of low impact materials, elements key to the scheme should be specified to achieve ratings of between A+ and C under The Green Guide's ratings. Insulation materials that are specified will also have a global warming potential (GWP) of 5 or less, with an ODP of 0. Additionally, 100% of all timber used as part of the scheme will be responsibly sourced from suppliers that are either Forest Stewardship Council (FSC) accredited, Programme for the Endorsement of Forestry Certification accredited, or a similar recognised accreditation body.

To further promote embodied energy and carbon savings, the scheme will first prioritise the reusing of any demolished materials within the site, however if this is not possible secondary priority must be given to the redirecting from landfill, in line with the waste hierarchy.

Finally, in addition to the above policy points, the development is also recommended to register with the Considerate Constructors Scheme, or a similar approved scheme.

2.4.8 Pollution Control

To reduce emissions of gases with high global warming potential (GWP) and nitrogen oxide (NOx) into the atmosphere, new buildings will be specified with insulating materials that have a GWP of less than 5. This will follow throughout the development to reduce the impact that the construction phase has upon climate change.

Additionally, the following measures will be implemented:

- Pollution Prevention Guidance will be adhered to in respects of air (dust) and water (ground and surface) pollution during the demolition and construction phase.
- External light fittings will be controlled through a time switch, or daylight sensor, to prevent operation during daylight hours to limit the impact of artificial lighting for the development's residents and surrounding environment.

Sound insulation will be specified to achieve Building Regulation Part E compliance standard (this will be verified by pre-completion testing) in addition to meeting the requirements of the council. This will reduce the impact of sound pollution for the occupants within adjoining dwellings.

factor in increasing quality of life, preventing disease and illness, and mitigating climate change.

3 Feasibility Assessment of Renewable Energy and Low Carbon Technologies

Solar Hot Water (Thermal)

Solar water heating systems are one of the more familiar renewable technologies used at the moment. They use the energy from the sun to heat water, most commonly for hot water needs. Solar heating systems use a heat collector that is usually mounted on a roof in which the sun heats a fluid. This fluid is used to heat water that is stored in either a separate hot water cylinder or in a twin-coil hot water cylinder (the second coil is used to provide additional heating from a boiler or other heat source).

Solar hot water panels could be used however, PV will provide slightly better savings and avoid the need for water storage cylinders when compared.

Renewable Technology Not Chosen.

Photovoltaic Panels (PV)

Photovoltaic modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases of silicon. Through a process called doping, very small amounts of impurities are added to the semiconductor, which creates two different layers called n-type and p-type layers.

Certain wavelengths of light are able to ionize the silicon atoms, which separates some of the positive charges (holes) from the negative charges (electrons). The holes move into the positive or p-layer and the electrons into the negative or n-layer. These opposite charges are attracted to each other, but most of them can only re-combine by the electrons passing through an external circuit, due to an internal potential energy barrier. This flow of electrons produces a DC current.

A PV array can be mounted on the suitable roof space, however ASHPHW units are making significant carbon savings.

Renewable Technology Not Chosen

Ground Source Heat pumps

A heat pump is a device that takes up heat at a certain temperature and releases it at a higher temperature. The essential components of a heat pump are heat exchangers (through which energy is extracted and emitted) and a means of pumping heat between the exchangers. The effectiveness of the heat pump is measured by the ratio of the heating capacity to the effective power input, usually known as the coefficient of performance (COP). Ground-source heat pumps (GSHP) extract heat from the ground. They are classified as either water-to-air or water-to-water units depending on whether the heat distribution system in the building uses air or water. Ground source heat pumps either use long shallow trenches or deep vertical boreholes to take low grade heat from the ground and then compress it to create higher temperatures.

Ground source heat pumps would not be suitable due to the lack of land space around the properties and the associated costs.

Renewable Technology Not Viable

Air Source Heat pumps

Air source heat pumps absorb heat from the outside air. This is usually used to heat radiators, underfloor heating systems, or warm air convectors and hot water in your home. An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside.

The system performs down to air temperatures of -20°c which means that they are more than suitable for installations within the UK. Hot water and Heating can be provided 365 days a year. The hot water is produced without the aid of electrical immersions and at 55°c is more than hot enough for baths and showers.

There are two main types of air source heat pump system:

- An air-to-water system distributes heat via your wet central heating system. Heat pumps work much more efficiently at a lower temperature than a standard boiler system would. So they are more suitable for under-floor heating systems or larger radiators, which give out heat at lower temperatures over longer periods of time.
- An air-to-air system produces warm air which is circulated by fans to heat your home. They are unlikely to provide you with hot water as well.

Air Source heat pumps are a good option to provide heating and cooling. A Dimplex Edel is to be specified to satisfy the hot water demands.

Chosen Renewable Technology

Biomass Heating

Biomass is any plant-derived organic material that renews itself over a short period.

Biomass energy systems are based on either the direct or indirect combustion of fuels derived from those plant sources. The most common form of biomass is the direct combustion of wood in treated or untreated forms. The use of biomass is becoming increasingly common in some European countries.

The environmental benefits relate to the significantly lower amounts of energy used in biomass production and processing compared to the energy released when they are burnt. This can range from a four-fold return for biodiesel to an approximate 20-fold energy return for woody biomass. Biomass-fuels can be used to produce energy on a continuous basis (unlike renewables such as wind or solar energy) and it can be an economic alternative to fossil fuels as it is a potential source of both heat and electricity.

However, Biomass systems have particular design management and maintenance requirements associated with sourcing, transportation and storage and are therefore more commonly used in commercial developments rather than domestic installations. It can be less convenient to operate than mains-supplied fuels such as natural gas and are more management intensive and require expertise in facilities management. Sources of biomass can also fluctuate, so boilers should be specified to operate on a variety of fuels without risk of overheating or tripping out.

A communal biomass system would not be feasible for this development due to the expense associated with the necessary output to heat all dwellings on the site.

Renewable Technology Not Chosen

Wind

Wind turbines convert the kinetic energy in wind into mechanical energy that is then converted to electricity. Turbines are available in a range of sizes and designs and can either be free-standing, mounted on a building or integrated into a building structure.

The wind speed in the area is under the advised minimum and the built-up area means that a wind turbine wouldn’t be feasible.

Renewable Technology Not Viable

4 Conclusion

This statement has assessed the proposed development at the 118 Malden Road site against the relevant climate change and sustainability policies and targets, as outlined within: the London Borough of Camden Local Plan 2016 and The London Plan 2021, through the following of the energy hierarchy, the modelling of apartments in the FSAP 10.2 software and addressing all aspects of a sustainable development. In addition, the proposal has been assessed against national sustainable design definitions to determine how it can be classified.

As part of this process, the development was designed with a fabric first approach; with U-values, design air permeability and ventilation targets all aspiring to exceeding Building Regulations Part L 2013 standards. Following on from this, efficient MVHR systems were proposed for each apartment and house, to further reduce the total energy demands whilst simultaneously providing each dwelling with healthy internal environments. This approach demonstrates a holistic low energy design concept, involving very low limiting values and thus led to high-energy performance targets.

Furthermore, an LZC feasibility assessment was carried out, with all suitable technologies investigated for their suitability to the site and development. The assessment determined that a Dimplex Edel unit is to be specified to each flat and would provide an additional 65.9% reduction in carbon emissions over the residual emissions: bringing the total carbon reduction to 70.3%.

The development will also be adapting to climate change by incorporating sustainable drainage measures into the design, protecting existing ecology, enhancing biodiversity where possible and providing cycle storage provision to residents.

In addition to the following of the energy hierarchy through the efficient design and renewable technology measures mentioned and meeting all relevant London Borough of Camden and London Plan carbon targets the proposal will include a large number of sustainability measures throughout construction and once completed, which will contribute heavily to the development's sustainability performance and accord with the requirements of the NPPF. The key measures to be included and therefore can be taken from this report include:

- The proposal sits within Flood Risk Zone 1 and therefore has minimal to no risk of flooding.
- A SUDs strategy will be produced to outline all measures to be incorporated that will ensure any additional surface water is collected, treated and removed.
- The development will incorporate green infrastructure in the form of extensive planting involving hedges, trees, sedum/green roofs and ornamental planting that will instil a sense of wellbeing whilst also assisting with offsetting carbon dioxide and balancing local temperatures through evapotranspiration.
- Internal water efficiency will be prioritised by ensuring that efficient water fixtures are proposed so that each dwelling achieves less than 110L per person per day and 'A' rated appliances will be specified where possible.

- Waste minimisation will be targeted from throughout construction and occupational phase. It is targeted that at least 90% of construction waste will be diverted from landfill. Whilst tri-separator refuse shoots will be installed on each floor to promote recycling.
- In addition to targeting Secure by Design accreditation through adoption crime prevention measures, the site layout promotes busy spaces and routes and facilitates natural surveillance. These will therefore reduce the fear of crime and subsequently improving mental health of residents, visitors and workers.
- Prioritising reusing existing materials and locally sourced materials for construction to reduce waste and transportation to landfill in addition and promote a low embodied carbon development.
- When new materials are specified that are not locally attainable then only those that score well on the BRE: The Green Guide to Specification are to be used; to further encourage the use of sustainable materials and reductions in embodied carbon.
- The buildings will have a daylight and sunlight analysis carried out and will aim to achieve high pass rates. Additionally, highly efficient MVHR systems are being proposed to each flat individually to provide a continuous source of fresh air and maintain healthy indoor environments. These will promote healthy housing and subsequently boost physical and mental wellbeing of residents.

As a result of all the above, the proposed sustainable design and energy strategy allows the development to comply with both the London Plan and London Borough of Camden planning policy requirements and is in line with all targets put forward in their planning documents.

House Type/Name	Houses	Flats	Flat 3	Flat 4	TOTAL (kWh/yr)	SAP 10.2	TOTAL (kgCO2/yr)
Frequency	1	1	1	1	4		
BASELINE Dwelling Emission Rate (DER)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)
Main Heating Fuel Requirement (DER)	1321.2692	1546.3682	1305.0331	2295.589	6468.3	0.210	1358.3
Secondary Main Heating Fuel Requirement (DER)	0	0			0.0	0.136	0.0
Secondary Heating Fuel Requirement (DER)	0	0			0.0	0.136	0.0
Water Fuel Requirement (DER)	2700.7737	2651.784	2582.2039	2761.5128	10696.3	0.210	2246.2
Electricity Pumps Fans Requirement (DER)	86	86	86	86	344.0	0.136	46.8
Electricity Lighting Requirement (DER)	163.5632	158.8319	150.1624	177.8391	650.4	0.136	88.5
PV Energy Produced					0.0	0.136	0.0
TOTAL PER DEVELOPMENT					13983.1		3171.9
AFTER ENERGY SAVING MEASURES Dwelling Emission Rate (DER)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)
Main Heating Fuel Requirement (DER)	425.7424	876.3142	572.8378	1415.8509	3290.7	0.210	691.1
Secondary Main Heating Fuel Requirement (DER)	0	0			0.0	0.136	0.0
Secondary Heating Fuel Requirement (DER)	0	0			0.0	0.136	0.0
Water Fuel Requirement (DER)	1831.1058	1800.7903	1744.1684	1902.5332	7278.6	0.210	1528.5
Electricity Pumps Fans Requirement (DER)	824.1097	804.2637	810.9352	841.6544	3281.0	0.136	446.2
Electricity Lighting Requirement (DER)	181.7024	175.2683	163.517	200.5554	721.0	0.136	98.1
					0.0		0.0
TOTAL PER DEVELOPMENT					14571.3		2763.8
FINAL Dwelling Emission Rate (DER)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Total Energy Demand (kWh/yr)	Carbon Emission Factor	Associated Total CO2 (kgCO2/yr)
Main Heating Fuel Requirement (DER)	408.1718	800.6962	535.6313	1269.5645	3014.1	0.136	409.9
Secondary Main Heating Fuel Requirement (DER)	0	0			0.0	0.136	0.0
Secondary Heating Fuel Requirement (DER)	0	0			0.0	0.136	0.0
Water Fuel Requirement (DER)	668.8872	659.8813	643.0604	690.1064	2661.9	0.136	362.0
Electricity Pumps Fans Requirement (DER)	138.1097	118.2637	124.9352	155.6544	537.0	0.136	73.0
Electricity Lighting Requirement (DER)	181.7024	175.2683	163.517	200.5554	721.0	0.136	98.1
TOTAL PER DEVELOPMENT					6934.0		943.0
PV Energy Produced (DER)					0.0	0.136	0.0
TOTAL PER DEVELOPMENT					6934.0		943.0

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