



Energy & Sustainability
Statement

807 High Road
LONDON
N17 8ER

31st October 2022

Contents

1	Executive Summary	3
2	Site, Proposal & Planning Policy	4
3	Baseline Energy results	9
4	Design for Energy Efficiency "Be Lean"	13
5	Supplying Energy Efficiently "Be Clean"	19
6	Renewable Energy Options "Be Green"	23
7	Sustainable Design and Construction	27
8	Conclusions	32

Appendices

A	SAP & SBEM TER Outputs – Baseline Energy Use
B	SAP & SBEM BER Outputs – "Be Lean"
C	SAP & SBEM BER Outputs - Final Emissions – "Be Green"
D	Excel Spreadsheet – SAP10 Project Calculations
E	TM59 Overheating Analysis

1.0 Executive Summary

The proposed development at the 807 High Road has been designed to achieve the highest of environmental performance standards following the Energy Hierarchy as set down by the London Plan and the London Borough of Haringey's relevant Policy documents.

The new build mixed use development will offer ground floor retail space, first floor flexible office/non-residential institution space (B1/D1), with 9 flats on the upper floors.

The commercial spaces will be assessed against the BREEAM environmental standard and will aspire to a rating of BREEAM Excellent.

A 'Lean, Clean, Green' approach to assessing energy and thermal comfort needs and appropriate solutions has been adopted following the guidance under Chapter 5 of The London Plan and the latest GLA guidance. The development achieves an overall improvement (BER/TER) in regulated emissions of **>68.55%** over the Part L 2013 standard (against SAP10 emissions standards), more than double the 35% reduction required under planning policy. Considering unregulated energy use also, the reduction in overall emissions is **>50.80%**. These reductions are achieved through the adoption of high standards of insulation, efficient heat pump driven heating and hot water systems and a roof mounted PV array.

The reduction in regulated emissions achieved through the use of renewable and energy generating technologies is over **59.21%**.

2.0 The Site & Proposal

The existing site at 807 High Road is currently occupied by a part single storey, part 2 storey commercial building, with the 2 storey accommodation fronting the High Road itself.

The proposals involve the demolition of existing building and construction of a ground retail (A1) spaces, first floor flexible B1/D1 space and nine residential units on upper floors, all arranged around a central courtyard.

2.1 Planning Policy

The project sits within the London Borough of Haringey and specific planning guidance has been taken into account; the most relevant policy documents are the Local Plan: Strategic Policies 2013 (with alterations 2017) and the Development Management DPD (Adopted July 2017).

More specifically, under the current planning permission there is a requirement to submit an updated energy statement – in line with local and regional energy policies:-

Energy & Sustainability Statement (PRE-COMMENCEMENT)

18. (a) No development shall take place until an updated Energy & Sustainability Statement has been submitted to and approved in writing by the Local Planning Authority. This shall demonstrate that the approved development has made acceptable provisions to connect to a North Tottenham Decentralised Energy Network (DEN), with an interim heating solution and SAP2012 carbon factors. This updated Energy & Sustainability Statement shall include the following:

- i. A plan showing the required layout of infrastructure (including conduit space, pipes and plant room) to connect to a future DEN;*
- ii. Drawings and specifications setting out how the detailed design of the heat network and how this complies with CIBSE CoP1 (as amended) and the LBH Generic Specification. This should include detail of pipe routes and lengths, pipe sizes (taking account of flow and return temperatures and diversification) and insulation to determine heat loss from the pipes in W/dwelling in order to demonstrate losses have been minimised;*
- iii. Buried pipe (dry and filled with nitrogen) to LBH's approved specification from the ground floor plant room to a manhole at the boundary of their site and evidence of any obstructions in highway adjacent to connection point;*
- iv. A clear plan for Quality Assurance of the network post-design approval through to operation, based on CP1;*
- v. A clear commercial strategy identifying who will sell energy to residents and how prices/quality of service will be set;*
- vi. Calculations to determine how carbon offset payments are to be split between the 'initial offset' (100% of which to be paid on commencement) and the 'deferred offset'. (payable if no connection to a DEN within 10 years from the date of planning permission being granted);*

- vii. Details of the interim heating solution, including the proposed system's seasonal efficiency (in energy, carbon and NOx emissions); and*
- viii. A metering strategy*

Overheating

19. (a) No development shall take place until written evidence to demonstrate the following has been submitted to and approved by the Local Planning Authority:
- i. How the detailed design stage has explored and identified further mitigation measures to reduce the risk of overheating for the development under Design Summer Years 2 and 3 for London under TM59
 - ii. Details of a home user guide that shall be made available to all residents that first occupy the approved dwellings.

The above noted Local Plan policies are noted below:-

Key Strategy Policy SP4: Working towards a Low Carbon Haringey, requires:-

Over the lifetime of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:

a. From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO2 emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and

b. From 2011 onwards all new non-residential development shall be built to at least BREEAM "very good" standard and should aim to achieve BREEAM "excellent" or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.

2. The Council will promote low- and zero-carbon energy generation through the following measures:

a. Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;

b. Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;

c. Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and

d. All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy

The key DM policy is Policy DM21: Sustainable Design, Layout and Construction

A All new development, including building and landscape works, will be expected to consider and implement sustainable design, layout and construction techniques.

Proposals should:

a Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements;

b Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems;

c Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls

d Wherever possible, use building materials with high environmental performance ratings; and

e Seek opportunities for locally sourced labour.

B The Council will support appropriate measures to sustainably retrofit existing homes and non-residential buildings.

C Proposals that fail to demonstrate adequate consideration for sustainable design, layout and construction techniques will be resisted.

D Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.

Accordingly, this report will be informed by, and be compliant with all of the above policy requirements as well as following the London Plan guideline for the production of Energy Assessments:-

2.2 The New London Plan

The New London Plan is due to be adopted in the coming months and as such is considered as a material consideration for new planning applications

Chapter 9 deals with Sustainable Infrastructure:-

Policy SI2 Minimising greenhouse gas emissions

Major development should be net zero-carbon. This means reducing carbon dioxide emissions from construction and 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 construction and operation.
- 2) Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly. Development in Heat Network Priority Areas should follow the heating hierarchy in Policy SI3 Energy infrastructure.
- 3) Be green: generate, store and use renewable energy on-site.

Major development should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy and will be expected to monitor and report on energy performance.

In meeting the zero-carbon target a minimum on-site reduction of at least 35 per cent beyond Building Regulations is expected. Residential development should aim to achieve 10 per cent, and non-residential development should aim to 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:

- 1) through a cash in lieu contribution to the relevant borough's carbon offset fund, and/or
- 2) off-site provided that an alternative proposal is identified and delivery is certain.

Policy SI3 Energy infrastructure

Major development proposals within Heat Network Priority Areas should have a communal 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 available local secondary heat sources (in conjunction with heat pump, if required, and a lower temperature heating system)
- c) generate clean heat and/or power from zero-emission sources
- d) use fuel cells (if using natural gas in areas where legal air quality limits are exceeded all development proposals must provide evidence to show that any emissions related to energy generation will be equivalent or lower than those of an ultra-low NOx gas boiler)
- e) use low emission combined heat and power (CHP) (in areas where legal air quality limits are exceeded all development proposals must provide evidence to show that any emissions related to energy generation will be equivalent or lower than those of an ultra-low NOx gas boiler)
- f) 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 there is no significant impact on local air quality.

3) Where a heat network is planned but not yet in existence the development should be designed for connection at a later date.

Policy SI4 Managing heat risk

Development proposals should minimise internal heat gain and the impacts of the urban heat island through design, layout, orientation and materials.

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

- 1) minimise internal heat generation through energy efficient design
- 2) reduce the amount of heat entering a building through orientation, shading, albedo, fenestration, insulation and the provision of green roofs and walls
- 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.

Policy SI5 Water infrastructure

Development proposals should:

- 1) 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 (commercial development)
- 3) be encouraged to incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future proofing.

3.0 Baseline energy results

The first stage of the Mayor's Energy Hierarchy is to consider the baseline energy model. The following section details the baseline energy requirements for the development – the starting point when considering the energy hierarchy.

3.1 New Build Apartments

The baseline emission levels – the Target Emission Rate (TER) as required for Building regulations compliance - is obtained by applying the design to a reference 'notional' building the characteristics of which are set by regulations – SAP2012; The new Part L Building Regulations 2013 came into force on April 2014 and introduced a completely new notional dwelling as detailed below:-

Table 4 Summary of concurrent notional dwelling specification

Element or System	Values
Opening areas (windows and doors)	Same as actual dwelling up to a maximum proportion of 25% of total floor area [1]
External Walls (including opaque elements of curtain walls) [6]	0.18 W/m ² K
Party Walls	0.0 W/m ² K
Floor	0.13 W/m ² K
Roof	0.13 W/m ² K
Windows, roof windows, glazed rooflights and glazed doors	1.4 W/m ² K [2] (Whole window U-value) g-value = 0.63 [3]
Opaque doors	1.0 W/m ² K
Semi glazed doors	1.2 W/m ² K
Air tightness	5.0 m ³ /hr/m ²
Linear thermal transmittance	Standardised psi values – See SAP Appendix R, except use of y=0.05 W/m ² K if the default value of y=0.15 W/m ² K is used in the actual dwelling
Ventilation type	Natural (with extract fans) [4]
Air conditioning	None
Element or System	Values
Heating System	Mains gas If combi boiler in actual dwelling, combi boiler; otherwise regular boiler Radiators Room sealed Fan flue SEDBUK 2009 89.5% efficient
Controls	Time and temperature zone control [5] Weather compensation Modulating boiler with interlock
Hot water storage system	Heated by boiler (regular or combi as above) If cylinder specified in actual dwelling, volume of cylinder in actual dwelling. If combi boiler, no cylinder. Otherwise 150 litres. Located in heated space. Thermostat controlled Separate time control for space and water heating
Primary Pipework	Fully Insulated
Hot water cylinder loss factor (if specified)	Declared loss factor equal or better than 0.85 x (0.2 + 0.051 V ² /3) kWh/day
Secondary Space Heating	None
Low Energy Lighting	100% Low Energy Lighting
Thermal Mass Parameter	Medium (TMP=250)

SAP first creates the notional reference building, based upon the same shape and form as the proposed dwelling and applies the above characteristics as defined in SAP2012.

Once all of the baseline emission rates have been calculated in line with the above Government approved methodologies, they are considered as stage 'zero' of the energy hierarchy as described earlier and Target Emission Rate sets the benchmark for the worst performing, but legally permissible, development.

For the project at 807 High Road a sample of 4 flats has been selected at lower, mid floors and top floor to offer a representative collection to enable an accurate figure for emissions per sqm of development which can then be applied to the full gross internal residential floor area.

The commercial floorspace has been assessed under 1 x SBEM.

3.1 New Build Commercial Space

The energy requirements for space heating, water heating and ventilation within the new build retail space have been calculated using the National Calculation Method (NCM) in line with AD L2A of the Building Regulations 2013 and the Non-Domestic Heating Compliance Guide.

The Government approved assessment methodology is the Simplified Building Energy Model (SBEM), eb7 Sustainability Ltd use an advanced modelling software - Design Builder - which enables accurate SBEM models to be created, as well as heat loss and cooling load calculations and full M&E design to be undertaken.

To consider the subject building performance against The Building Regulations (Approved Document L2A) SBEM first creates the notional reference building, the characteristics of which are defined within NCM and the minimum fabric values and fixed services efficiencies set down by AD L2A and the Non-domestic Compliance Guide.

In order to establish the baseline, the HVAC solution has been assumed as a low temperature hot water (LTHW) heating system, via centralised gas fired boilers and natural ventilation. Domestic Hot Water (DHW) will be supplied from the same boilers via appropriately sized calorifiers and a secondary circulation loop.

Electrically driven mechanical cooling will be assumed at the baseline stage for the retail spaces, in line with the latest GLA guidance on the preparation of energy statements.

This creates the Target Emission Rate (TER) and should be considered as stage 'zero' of the energy hierarchy as described earlier and sets the benchmark for the worst performing, but legally permissible, development against which, SBEM assesses the "actual" design, fabric values, heating lighting and ventilation systems and creates the Building Emissions Rate (BER).

3.2 Unregulated Energy Use

The baseline un-regulated energy use for cooking and appliances in the residential units have been calculated using the SAP Section 16 methodology; the same calculation used for Code for Sustainable Homes (CfSH) Ene 7.

$$\text{Appliances} = E_A = 207.8 \times (\text{TFA} \times N)^{0.4714}$$

$$\text{Cooking} = (119 + 24N)/\text{TFA}$$

N= no of occupant SAP table 1B

TFA – Total Floor Area

The unregulated energy use for the retail space can be derived from the BRUKL outputs under section “Energy Consumption by End Use” – “Equipment”.

The unregulated energy use per sqm is summarised in Table 1 below and amended to reflect SAP10 emission values.

The full spreadsheet of all calculations for the project is attached at **Appendix D**.

Table 1 – Unregulated Energy Use

Unit	Unregulated Energy Use
	Kg/sqm
L01 – 3 Bed (5P)	6.83
L01 – 2 Bed (4P)	6.86
L02 – 1 Bed Mid (2P)	7.04
L03 – 1 Bed (2P)	6.99
Residential Average	6.91
Commercial Spaces	3.85

The un-regulated emission rates are added to the baseline regulated emission rates (as calculated above) in order to set the total baseline emission rates before then applying the energy hierarchy in line with The London Plan and Local Plans policies: -

Table 2 – Baseline energy consumption and CO2 emissions

Unit	Target Emission Rate (regulated energy use) Kg/sqm	Unregulated Energy Use Kg/sqm	Total baseline emissions Kg/sqm	Total baseline emissions Kg
L01 – 3 Bed (5P)	17.84	6.83	24.66	2171.95
L01 – 2 Bed (4P)	17.61	6.86	24.47	1950.56
L02 – 1 Bed Mid (2P)	18.60	7.04	25.63	1303.28
L03 – 1 Bed (2P)	21.21	6.99	28.20	1626.14
Residential Total				14590
Commercial Space	14.22	3.85	18.07	3733
Total				18,323

The baseline BRUKL and SAP TER outputs (which summarise the key data) are attached at **Appendix A**, with the SAP 10 calculations attached at **Appendix D**.

4.0 Design for energy efficiency

The first step in the Mayor's 'Energy Hierarchy' as laid out in Section 5 of The London Plan, requests that buildings be designed to use improved energy efficiency measures – Be Lean. This will reduce demand for heating, cooling, and lighting, and therefore reduce operational costs while also minimizing associated carbon dioxide emissions.

This section sets out the measures included within the design of the development, to reduce the demand for energy, both gas and electricity (not including energy from renewable sources). The table at the end of this section details the amount of energy used and CO₂ produced by the building after the energy efficiency measures have been included. From these figures the overall reduction in CO₂ emissions, as a result of passive design measures, can be calculated. To achieve reductions in energy demand the following measures have been included within the design and specification of the building:

4.1 Passive Design

The National Planning Policy Framework emphasises the need to take account of climate change over the longer term and plan new developments to avoid increased vulnerability to the range of impacts arising from climate change. The UK Climate Impacts Programme 2009 projections suggest that by the 2080's the UK is likely to experience summer temperatures that are up to 4.2°C higher than they are today.

Accordingly, designers are to ensure buildings are designed and constructed to be comfortable in higher temperatures, without resorting to energy intensive air conditioning.

In line with current GLA Guidance, the project at High Road has had been designed to ensure the building is not vulnerable to overheating; to instigate consideration of the risk of overheating with the proposed development, the design team have followed the guidance within the London Plan, Section 5.9, which consider the control of overheating using the Cooling Hierarchy:-

1. minimise internal heat generation through energy efficient design

The project will be designed to best practice thermal insulation levels as noted, full details of which are noted under 4.3 below.

Not only does good insulation assist in reducing heat losses in the winter, it has a significant impact on preventing heat travelling through the build fabric during the summer.

2. reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and wall

The development site is based in a low rise suburban situation within an existing retail terrace with an east-west aspect.

There is very little by way of topographical shading/protection to the newly proposed dwellings.

The east-west orientation of the development naturally avoids excessive exposure to the southern sun – all the residential units receive natural daylight from the north or east aspects.

The large easterly patio style glazing offers good levels of natural daylight, whilst utilising balcony overhangs to offer protective shading

The units to the High Road frontage do not have the ability to offer this shading, but glazed areas to the eastern aspect are much reduced.

Glazing specification has been considered as part of the overheating risk and the specified new glazing will achieve a g-value of 0.45 or better in order to assist in reducing overheating risk from excessive solar gain.

A landscaped first floor podium is designed to offer local evaporative cooling.

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

All houses are designed with floor to ceiling heights at circa 2.5m.

The new build structure is expected to be of traditional brick and block within a steel frame offering significant thermal mass able to absorb heat during the summer months, which can then be ventilated during the evening or overnight.

4. passive ventilation

The majority of dwellings have been designed to offer the potential for cross ventilation and all glazing is designed to have opening areas to introduce high levels of natural levels of “purge” ventilation to further assist in the reduction of overheating risks in appropriate areas.

5. mechanical ventilation

Given the High Road location, the design team are proposing the use of mechanical ventilation with heat recovery – ensuring a high quality internal environment and reducing exposure to location based. noise and air quality impacts

4.2 Summer Overheating Analysis

The formal overheating analysis can be viewed at Appendix E.

The overheating analysis confirms that the project is compliant with the London Plan requirements and passes the TM52 and “bedroom” tests for the CIBSE TM49 DSY 1

However, Condition 19 requires:-

Overheating

19. (a) No development shall take place until written evidence to demonstrate the following has been submitted to and approved by the Local Planning Authority:

i. How the detailed design stage has explored and identified further mitigation measures to reduce the risk of overheating for the development under Design Summer Years 2 and 3 for London under TM59

Accordingly, mitigation measures to be instigated include:-

The ability to “lock open” patio doors and bedroom windows to enable night time or purge ventilation without compromise to security.

Installation of solar reflective film, a typical option could be 3M™ Sun Control Window Film Prestige 70 Exterior, which can reflect a further 50% of potential solar gain from the applied windows, with a film that is virtually clear – thus having no impact on the external aesthetics.

Additionally, residents will be provided with a user guide that explains to occupants the key features of the scheme; this should be a short and visual document in simple language. It should cover measures they can take to prevent overheating in their home and include the following information as a minimum:

Blinds can be installed that will provide a resistance to the solar gain. Blinds that are white or light in colour, offer an increased reflectivity than darker colours. Vertical fin blinds work more effectively to as the offer least restriction to the airflow, which provides an element of free cooling.

During days of peak summer temperatures, occupants will be advised to keep the windows closed when the building is left unoccupied when the external air temperature exceeds that of the internal air temperature – i.e. feels uncomfortably warm, if done in conjunction with closing the blinds the internal air temperature will be kept to a minimum.

Finally, advice will be given on evening purge ventilation; once the external air temperature has decreased, this will subsequently reduce the likeliness of night-time overheating between the hours of 2200 – 0700.

Additional options that are able to be explored in future years include:-

Installation of external air permeable shutters, able to be closed during the day or during periods of non-occupation – cutting out all solar gains.

Upgrade of the MVHR systems at end-of-life to incorporate small cooling coils – a rapidly emerging technology that can be assumed to have reached maturity in circa 20 years time, when MVHR systems would need replacing.

4.3 Heating system

For the energy efficient model, the primary heating system for the dwellings and retail units will consist of high efficiency internal heat pumps with local individual controls throughout.

To increase the efficiency in the use of the heating system, the following controls will be used.

- Time and temperature zone control
- Weather compensation system

DHW in the retail space will be assumed to be via point of use water heaters – the most efficient manner to provide DHW in such spaces due to the very low demand.

4.4 Fabric heat loss

Fabric

Insulation measures will be utilised to ensure the calculated u values exceed the Building Regulations minima, with specific guidance taken from the design team: -

New wall constructions are yet to be specified, but the design team is targeting achieving a u-value of 0.16 via a highly insulated brick and block construction within a steel frame utilising phenolic foam insulation.

The roof structures and terraces will be designed to meet a u-value of 0.12

The exposed ground floors will target a u value at 0.14 or better

Glazing

New glazing units for the residential spaces will be triple glazed with an area weighted average u-value of 1.1w/m² K or better.

Commercial spaces will have glazing installed meeting a u value at 1.4

Air Tightness

The project will be tested for air tightness with a target value of 3m³/hr/m² in line with best practice for mechanically ventilated buildings.

Construction Details

Heat loss via non-repeating thermal bridging will be minimised by the use of Accredited Construction Details for these new build units to ensure compliance with the minimum standards for dwelling fabric energy efficiency under SAP2012.

4.5 Ventilation

As noted above, the flats and retail units will utilise low energy MVHR units providing fresh air to maintain the required levels of air quality.

4.6 Lighting

A 100% of internal light fittings throughout the development will be dedicated low-energy/compact fluorescent fittings, with extensive use of LED lighting.

PIR/presence controls will be used in the common areas and stairwells to ensure lights do not operate when not required.

Commercial units will feature daylight dimming to naturally lit areas to further enhance lighting system efficiency.

To further reduce energy consumption, the developers will adopt Code for Sustainable Homes principles, providing A rated white goods, ensuring all external lighting systems are high efficacy with appropriate daylight controls and providing smart metering to enable occupant to measure and manage their energy consumption.

4.7 Energy efficiency results

The following table shows a comparison between the baseline scheme assessed under the SAP and SBEM methodology Part L minima and the scheme following the introduction of energy efficiency measures (not including energy from renewable sources), with the calculation data attached at **Appendix D**.

Table 3 – Energy consumption and CO2 reductions

Unit	Building Emission Rate (regulated energy use) Kg/sqm	Unregulated Energy Use Kg/sqm	Total emissions Kg/sqm	Total emissions Kg
L01 – 3 Bed (5P)	14.97	6.83	21.79	1919.02
L01 – 2 Bed (4P)	13.95	6.86	20.82	1659.37
L02 – 1 Bed Mid (2P)	14.82	7.04	21.86	1111.31
L03 – 1 Bed (2P)	16.83	6.99	23.82	1373.66
Residential Total				12545
Commercial Space	9.07	3.85	12.92	2669
Total				15,01213

The results show that, for the new development with the energy efficiency measures, the reduction in CO₂ emissions is **16.97%**.

The proposed development, therefore, goes more than 10% beyond the requirements of the now stringent 2013 Building Regulations using passive energy efficiency measures as per the latest GLA guidance.

The SAP and BRUKL Building Emission Rates output is attached at **Appendix B**.

As per the requests of the LPA, the energy demands of the proposed development are tabulated below.

Building Use	Energy demand following energy efficiency measures (Mwh/year)						
	Space Heating	Hot Water	Lighting	Cooling	Auxiliary	Unregulated electricity	Unregulated gas
Residential Total	24.05	11.61	2.53	0	2.23	8.78	N/A
Non-residential Total	2.55	0.49	2.99	1.55	1.32	3.04	N/A

5.0 Supplying Energy Efficiently

Haringey Local Plan policy - promotes zero carbon development by requiring all development to demonstrate it has minimised on-site CO₂ emissions and supports development of decentralised energy networks.

The second stage in the Mayor's 'Energy Hierarchy' is to ensure efficient and low carbon energy supply – Be Clean. In particular, this concerns provision of decentralised energy where practical and appropriate.

5.1 Community Heating/Combined Heat and Power (CHP)

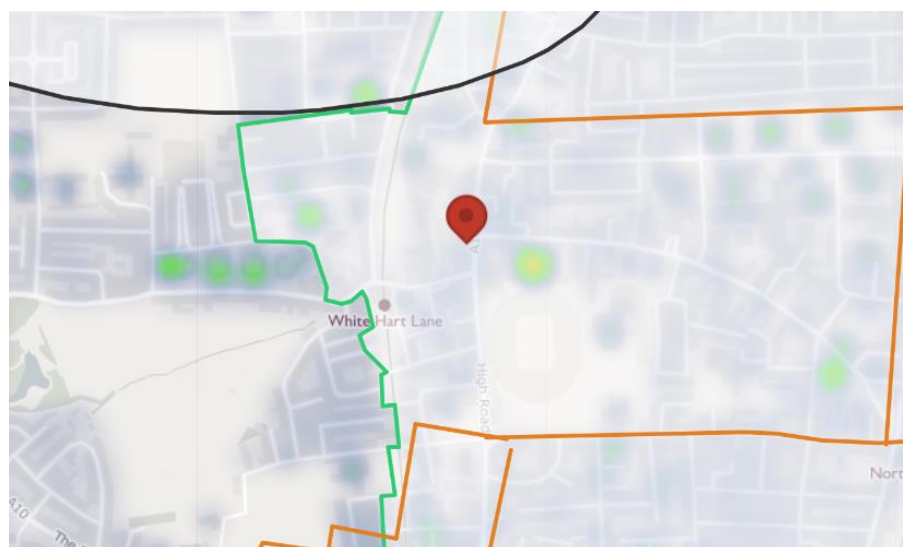
The London Plan, Policy 5.6 - Decentralised energy in development proposals requires:

- Development proposals should evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate also examine opportunities to extend the system beyond the site boundary to adjacent sites.

Combined heat and power systems are essentially biomass or fossil fuel fired electricity generators that use the heat by-product to provide space and water heating. The electricity generated can be used directly within the host buildings or sold to electricity suppliers on the national grid. These systems can be employed on a large scale for community schemes or at the micro scale for individual dwellings.

Alternatively larger scale systems operated as a standalone entity can be used to provide heat and power to the local neighbourhood.

Therefore, this report must consider the availability – now or in the future – of heat networks in the Haringey area. The extract from the London Heat Map (reproduced below) suggests that the project sits within Greater London's Opportunity Area Planning Framework and close to potential heat networks.



Extract from London Heat map

Clearly there is limited potential for the project site to connect to a DEN at some time in the future.

Planning Condition 18 requires:-

- i. A plan showing the required layout of infrastructure (including conduit space, pipes and plant room) to connect to a future DEN;*
- ii. Drawings and specifications setting out how the detailed design of the heat network and how this complies with CIBSE CoP1 (as amended) and the LBH Generic Specification. This should include detail of pipe routes and lengths, pipe sizes (taking account of flow and return temperatures and diversification) and insulation to determine heat loss from the pipes in W/dwelling in order to demonstrate losses have been minimised;*
- iii. Buried pipe (dry and filled with nitrogen) to LBH's approved specification from the ground floor plant room to a manhole at the boundary of their site and evidence of any obstructions in highway adjacent to connection point;*

Accordingly, the design team still wish to ensure the potential to connect to a DEN, so provision will be made onsite to enable such a connection to any such future network to continue the supply of heating and DHW to the project.

Additional submission drawings demonstrate this provision;

- The construction of a plant room which would be capable of producing hot water for space heating and/or domestic hot water and site wide DHW distribution.
- Safeguarding an identified route from the plant room to the property boundary at ground floor level, roadway or similar for flow and return pipes to enable connection to a future area wide DEN.

In addition, this report demonstrates via the use of communal LTHW heating proposals that:-

- Appropriate design of on-site heating systems, such as, compatible return temperatures, tees and isolation valves to facilitate the connection to a district heating heat exchanger in future.

Guidance on the design of systems to enable future connection to a DEN requires that differential temperatures (difference between flow and return temperature) in the secondary distribution networks must be kept as large as possible to minimise pipe size, enable the supply of DEN heat from various heat sources and optimise any CHP output.

To ensure that low grade waste heat, and other heat sources, can be utilised on the DENs the secondary design must focus on low return temperatures; this can be incorporated into the LTHW circuit design via basic modification works at the time as required.

There would also be a requirement that there is space on site for piping connecting the point at which primary piping come onto onsite with the on-site heat exchanger located in a plant room. If the proposed site for the heat exchanger and the point at which DEN piping comes onto site are separated by an obstacle such as deep water feature, it may not be possible to connect them.

The additional drawings show an appropriate plant area at ground floor level, with no obstacles preventing future routing of a DEN onto site.

Any heat exchange equipment required can be readily met via a packaged skid with dimension at 1.5m x 0.5m x 2.0m (h). With an allowance for a 1m servicing area around the unit, the lower ground floor drawing demonstrates adequate space and location to accommodate the required equipment.

All other design requirements of Condition 18 are submitted under separate cover.

Further, Condition 18 requires:-

- iv. A clear plan for Quality Assurance of the network post-design approval through to operation, based on CP1;
- v. A clear commercial strategy identifying who will sell energy to residents and how prices/quality of service will be set;
- vi. Calculations to determine how carbon offset payments are to be split between the 'initial offset' (100% of which to be paid on commencement) and the 'deferred offset'. (payable if no connection to a DEN within 10 years from the date of planning permission being granted);

At the current time, calculations to determine how carbon offset payments are to be split between the 'initial offset' (100% of which to be paid on commencement) and the 'deferred offset' are not possible to undertake as there is no current data on the heat sources and/or efficiencies associated with the proposed new DEN.

Given the 10 year timescale to enable a DEN connection, such calculations will need to be undertaken when the above noted data is available.

Given that it would appear prudent to have the design to facilitate the future inclusion of district heating, and taking into account the scale of development involved - then consideration must be given for an on-site district heating/CHP solution for the subject development.

5.2 On-site CHP/District Heating

The heat production facility for a district heating scheme is generally considered to include heat only boilers (HOB) and/or the production of both electricity and heat i.e. CHP.

CHP is, as a rule of thumb, only operated as a base load, as depending on the technology, it may be difficult and/or inefficient to operate according to daily variations in demand. In a well-designed district heating network heat from CHP will provide between 60% and 80% of the annual baseline heat (heating and hot water) requirement with heat-only boiler plants providing the peak load and back-up. To maximise efficiency of the engine it needs to run for at least 17 hours a day; therefore, the heat load needs to be present for this period.

The key benefit from running a CHP engine is that it produces electricity, which can displace grid supplied electricity, which has significant carbon savings. It is for this reason that CHP is designed to run for as many hours of the year as possible.

GLA Guidance states non-domestic developments providing a substantial coincidence of demand for heat and power for the majority of hours in the year (5,000 hours per annum) and the heat to power ratio is low (e.g. 1:1), will still be expected to include on-site CHP as part of their energy strategy to meet the London Plan CO₂ reduction targets.

Clearly, as a relatively small scale residential development, where the only demand for hot water for several months of the year is limited morning and evening demand, an on-site CHP installation cannot be justified.

Equally, the retail spaces will have very limited DHW demand to support a CHP installation.

However, there is clearly an opportunity to introduce a community heat only system able to take advantage of the increased efficiencies available from cascading boiler systems.

This is also in keeping with the design team's desire to connect to any future available DEN, and this communal boiler system has been assumed from the Baseline stage of the energy hierarchy in line with the GLA guidance.

The plant room plant space at ground floor level will accommodate the boiler systems and required buffer vessels, with appropriate distribution systems through the common areas.

The boiler header systems will incorporate additional flow and return connection to enable any future DEN to connect into the communal heating systems. Heat interface units in each flat will be able provide heating and instant hot water to each unit.

6.0 Renewable Energy Options

The final element of the Mayor's 'Energy Hierarchy' requires development proposals should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible – Be Green.

This is further supported by Haringey's Local Plan policies

Renewable energy can be defined as energy taken from naturally occurring or renewable sources, such as sunlight, wind, wave's tides, geothermal etc. Harnessing these energy sources can involve a direct use of natural energy, such as solar water heating panels, or it can be a more indirect process, such as the use of Biofuels produced from plants, which have harnessed and embodied the sun's energy through photosynthesis.

The energy efficiency measures and the sourcing the energy efficiently outlined above have the most significant impact on the heating and hot water energy requirements for the development, and the associated reduction in gas consumption.

This section then sets out the feasibility of implementing different energy technologies in consideration of: -

- Potential for Carbon savings
- Capital costs
- Running costs
- Payback period as a result of energy saved/Government incentives
- Maturity/availability of technology
- Reliability of the technology and need for back up or alternative systems.

6.1 Government incentives

6.1.1 Smart Export Guarantee (SEG)

Introduced in 2020, the SEG will enable solar photovoltaic (PV), wind, hydro and anaerobic digestion (AD) installations up to 5MW and micro-combined heat and power (micro-CHP) up to 50kW will be able to receive an export tariff under the policy.

The SEG is a market-led initiative, requiring electricity supply licensees to offer export tariffs to eligible generators. Suppliers are free to set their own SEG compliant tariff price (provided it is above zero pence at all times) and decide how their tariffs work.

Installation owners are able to shop around and select the Licensee of their choice based upon an offer of the most appropriate tariff.

Payment are made against metered exports only.

6.1.1 Renewable Heat Incentive

The Renewable Heat Incentive (RHI) was formally withdrawn to all projects in March 2022.

6.2 Wind turbines

Wind turbines come in two main types'- horizontal axis and vertical axis. The more traditional horizontal axis systems rotate around the central pivot to face into the wind, whilst vertical axis systems work with wind from all directions.

The potential application of wind energy technologies at a particular site is dependent upon a variety of factors. But mainly these are: -

- Wind speed
- Wind turbulence
- Visual impact
- Noise impact
- Impact upon ecology

The availability and consistency of wind in urban environments is largely dependent upon the proximity, scale and orientation of surrounding obstructions. The site is surrounded by other properties of similar height in all directions. To overcome these obstructions and to receive practical amounts of non-turbulent wind, the blades of a wind turbine would need to be placed significantly above the roof level of the surrounding buildings and project site itself.

It is inconceivable that any wind turbines of this size would be considered acceptable in this location.

6.3 Solar Energy

The development at 807 High Road has areas of flat roof that could accommodate solar panels orientated to the south.

In general, the roofs will have an unrestricted aspect, so there is scope therefore to site solar photovoltaic (PV) or water heating equipment at roof level.

6.3.1 Solar water heating

Solar water heating panels come in two main types; flat plate collectors and evacuated tubes. Flat plate collectors feed water, or other types of fluid used specifically to carry heat, through a roof mounted collector and into a hot water storage tank. Evacuated tube collectors are slightly more advanced as they employ sealed vacuum tubes, which capture and harness the heat more effectively.

Both collector types can capture heat whether the sky is overcast or clear. Depending on location, approximately 900–1100 kWh of solar energy falls on each m² of unshaded UK roof surface annually. The usable energy output per m² of solar panel as a result of this amount of insolation ranges from between 380 – 550 kWh/yr.

Solar hot water systems are of course, displacing gas for DHW provision (as noted above), and due to the low emissions rates of gas as a source of energy, it would require a very large system to compete with the off-setting of electricity use afforded by PV panels.

Additionally, the use of solar thermal system would detract from the base hot water load that would underpin the connection to a DEN at any point in the future.

Accordingly, the use of solar thermal systems is dismissed.

6.3.2 Photovoltaics (PV)

A 1kWp (1 kilowatt peak) system in the UK could be expected to produce between 790-800kWh of electricity per year based upon a south east orientation according to SAP2005 methodology used by the Microgeneration Certification Scheme (MCS). The figure given in the London Renewables Toolkit is 783 kWh per year for a development in London.

The area of panelling required to achieve 1kWp is dependent upon the efficiency of the system, but in the case of 807 High Road, with a limited area of flat roof space at 4th floor level on the rear block; a high efficiency panel such as the Canadian Solar 325p series, which have a rating of 330w from 2.0m² of panel area would optimise the roof space available.

The withdrawal of the Feed in Tariff has now rendered such investments less attractive, however, there is still the benefit and carbon savings derived from the electricity produced – currently some 3.5 x as expensive as mains gas – so returns can still achieve in excess of 8%.

Accordingly, the installation of a PV array at upper roof level is recommended for the 807 High Road project; a 21 panel south facing array is proposed.

6.4 Biomass heating

Biomass is a term given to fuel derived directly from biological sources for example rapeseed oil, wood chip/pellets or gas from anaerobic digestion. It can only be considered as a renewable energy source if the carbon dioxide emitted from burning the fuel is later recaptured in reproducing the fuel source (i.e. trees that are grown to become wood fuel, capture carbon as they grow).

Biomass heating systems require space to site a boiler and fuel hopper along with a supply of fuel – which can be very bulky items. There also needs to be a local source of biomass fuel that can be delivered on a regular basis. There are also issues with fuel storage and delivery which mitigate against this technology. There is inadequate space at ground floor level for a fuel store and limited access for delivery lorries.

Additionally, a boiler of this type would replace the need for a conventional gas boiler and therefore offset all the gas energy typically used for space and water heating. However, biomass releases high levels of NO_x emissions, as well as other pollutants and would therefore have to be considered carefully against the high standard of air quality requirements in Haringey, as the whole borough has been designated as an Air Quality Management Area. Accordingly, the use of biomass is not considered appropriate for this project.

6.6 Ground source heat pump

All heat pump technologies utilise electricity as the primary fuel source – in this case displacing gas, as such, the overall reduction in emissions when using this technology can be less effective when opposed to a technology that is actually displacing electricity.

Ground source heating or cooling requires a source of consistent ground temperature, which could be a vertical borehole or a spread of pipework loops and a 'heat pump'. The system uses a loop of fluid to collect the more constant temperature in the ground and transport it to a heat pump. In a cooling system this principle works in reverse and the heat is distributed into the ground.

The heat pump then generates increased temperatures by 'condensing' the heat taken from the ground, producing hot water temperatures in the region of 45°C. This water can then be used as pre-heated water for a conventional boiler or to provide space heating with an under floor heating system.

The use of a ground source heating/cooling system will therefore require:

- Vertical borehole or ground loop
- Use of under floor heating
- Space for heat pump unit

Clearly, there is insufficient land area to install low level collector loops, leaving deep bore GSHP as the only potential option.

Normally the boreholes would need to be 6 to 8 metres apart and a 100 metre deep borehole will only provide about 5kW of heat. The borehole should also be formed around 3m away from the perimeter of the building and most specialists don't recommend using the structural boreholes.

Clearly, in the case of the proposed development at 807 High Road, there is no scope for the locating of the ground collector devices and as such, ground source heating cannot be considered.

6.7 Air source heat pump

Air source heating or cooling also employs the principle of a heat pump. This time either, upgrading the ambient external air temperature to provide higher temperatures for water and space heating, or taking warmth from within the building and dissipating it to the outdoor air.

It must be remembered that heat pumps utilise grid based electricity and the associated emissions, so that the actual reduction in emissions can be limited.

Assuming a seasonal system efficiency of 320% (Coefficient of Performance of 3.2) and that the air source heat pump will replace 100% of the space heating/hot water demand, then the system would reduce the overall CO₂ emissions by approximately 60%. The table below demonstrates, on the assumption of a demand of 1000Kwh/year for heating and hot water.

Table 4 – ASHP Performance

Type of Array	Energy Consumption (Kwh/yr.)	Emission factor (kgCO ₂ /Kwh)	Total CO ₂ emissions (kg/annum)
90% efficient gas boiler	11111	0.216	2400
320% efficient ASHP	2813	0.233	655
100% efficient immersion (back-up)	1000	0.233	233

A theoretical carbon saving of 63%

Condition 18 also requires that:-

vii. Details of the interim heating solution, including the proposed system's seasonal efficiency (in energy, carbon and NO_x emissions);

Accordingly, the design team are proposing the use of air source heat pumps for the individual dwellings, the NIBE fighter system with build in heat recovery in order to maintain the appropriate indoor air quality

Additionally, given the high internal gains expected within the ground floor retail/A1 spaces and upper floors B1/D1 uses - combined with the requirement to future proof the development against future overheating potential, the design team are proposing the use the heat pump principle in the form of variable refrigerant (VRF) flow air-to-air heating and cooling system which incorporates inter-zone heat recovery for the commercial units.

VRF systems can have numerous indoor units, served by a single outdoor unit, in both heating and cooling modes simultaneously. This mixed mode operation leads to energy savings as both ends of the thermodynamic cycle are delivering useful heat exchange. If a system has a cooling COP (Coefficient of Performance) of 3, and a heating COP of 4, then heat recovery operation could yield a COP as high as 7.



It should be noted that this perfect balance of heating and cooling demand is unlikely to occur for many hours each year, but whenever mixed mode is used energy is saved. In mixed mode the energy consumption is dictated by the larger demand, heating or cooling, and the lesser demand, cooling or heating is delivered free.

The high internal gains in commercial spaces makes the them an ideal candidate for a VRF system, particularly during the heating seasons, when the heat recovery mechanisms can recover the warmer air from these areas and deliver it to other areas requiring heat.

Accordingly, the design team are proposing the use of a new three pipe heat recovery VRF system utilising condensing units in the yard for the retail spaces, centralised branch selector boxes and void mounted fan evaporator units and/or ceiling cassettes. Whole system seasonal efficiencies (to be confirmed at commissioning) are expected to be at circa 4.6 for heating and 6.7 for cooling.

The use of these highly efficient electrically driven HVAC systems also offer the benefit of having a zero contribution to local environment's nitrous oxide and particulate levels; this is considered to be a significant advantage.

DHW will continue to be provided by point of use water heaters in these spaces

As per the requests of the LPA, the heating/cooling demand and the expected energy consumption figures are tabulated below.

	Heat Energy (Mwh/year)	Cooling Energy (Mwh/year)	Energy Consumption (Mwh/year)
Residential Total	34.2	0	12.21
Non-Residential Total	3.95	15.11	6.61

6.8 Final Emissions Calculation

Given the outcome of the feasibility study above, the developer is proposing the use the VRF heating and cooling in the offices spaces and a PV Array at 4th floor roof level; a 21 panel, 6.93Kwp PV array is to be installed to the roof area – this will produce circa 5,984.91Kwh per annum, saving an additional 3.11t of CO₂/annum

The final table – Table 5 – summarises the final BRUKL & SAP outputs; attached at **Appendix C** (with the SAP10 calculations attached at **Appendix D**.

Table 5 – “Be Green” emission levels

Unit	Emission Rate (regulated energy use) Kg/sqm	Unregulated Energy Use Kg/sqm	Total emissions Kg/sqm	Total emissions Kg
L01 – 3 Bed (5P)	5.41	6.83	12.23	1077.24
L01 – 2 Bed (4P)	5.08	6.86	11.94	951.65
L02 – 1 Bed Mid (2P)	4.82	7.04	11.86	602.85
L03 – 1 Bed (2P)	5.80	6.99	12.79	737.46
Residential Totals				6971
Commercial Spaces	6.04	3.85	9.89	2044
Total				9,014

The data at Table 5 confirms that overall emissions – including unregulated energy use - have been reduced by **50.80%** over and above the baseline model, with a **40.75%** reduction in emissions directly from the use of energy generating and renewable technologies, i.e. over and above the energy efficient model.

Excluding the un-regulated use, i.e. considering emissions controlled under AD Part L, then the reduction equates to **68.55%**.

7.0 Sustainable Design & Construction

The sustainable assessment criteria as developed by BRE are utilised within this report to confirm that the development meets with the requirements of the Haringey's sustainability policies

7.1.1 BREEAM New Construction 2018

There is a strategic policy requirement that the proposals should meet BREEAM "Very Good"; aspiring to achieve a BREEAM rating of "Excellent" (LBH Strategic Policies SP4),

For the commercial spaces, particular attention have been paid to the following issues:-

7.1.2 Energy efficiency; vacant & underused land and buildings

For matters of Passive Design, Solar gain control & daylighting, Ventilation, Thermal Performance, Services Strategy, Low or zero carbon technologies and overall Energy Performance, all these matters have been dealt within the London Plan compliant Energy Statement within Sections 2 to 6 above.

7.1.3 Materials

The design team have put a strong focus on sustainability and durability when considering construction profiles and building materials for the development. High Green Guide ratings will be achieved wherever possible and materials will be assessed for suitability with regards to Whole Life Costs.

Insulating materials will be specified to maximise thermal performance whilst still paying attention to the environmental impact of the materials used. The use of recycled products will be pursued wherever feasible and the use of other low embodied energy products will be further investigated.

Responsible sourcing will also be pursued. All timber used on site during the construction phase and within the building will be from FSC sources or equivalent. Other materials, including insulation, will be sourced from manufacturers who employ environmental management systems such as ISO 14001 or BES 6001. Where possible, materials will be sourced locally.

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

A Site Waste Management Plan (SWMP) will be produced for the site, which will determine how to maximise the recovery of materials from the enabling works for subsequent high-grade/value applications as noted under 7.2.

7.1.4 Air pollution

Construction site impacts

The construction site will be managed in such a way 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.

The contractor will be enrolled on the Considerate Constructors Scheme and achieve a best practice score of at least 35.

Plant and machinery

All plant and equipment installed in the building will be appropriately sized and selected for efficiency in order to reduce greenhouse gas emissions. All equipment will be frequently maintained to ensure it continues to run efficiently and cleanly.

Operational impacts

The use of heat pump technology for all heating systems and domestic hot water systems, confirms that the project will have a neutral impact on local air quality.

7.1.5 Noise pollution

Construction site impacts

The construction site will be managed in such a way that the environmental impact is minimised. This includes following best practice policies to minimise noise pollution, including the use of quieter machinery where possible. Site working hours will be managed to mitigate the possibility that they will cause a nuisance to the surrounding properties.

Noise impact of the building

The development will comply with Building Regulations Part E, providing a good level of sound insulation between the proposed development and surrounding buildings. All new windows will be double glazed to minimise the transmission of noise between the building and adjacent properties.

There are no proposals for external plant that could cause a noise nuisance.

7.1.6 Contaminated land

It is not thought that the site is contaminated, however, given the previous commercial use, a site investigation will be undertaken to investigate this issue, with any contaminants formally remediated.

The proposed building use will not involve the storage, processing or transfer of hazardous substances.

7.1.7 Water quality, saving and drainage

Flood risk and surface water drainage

The design team have commissioned a formal report to consider the projects risk of flooding from all sources, the projects impact on surface water run-off and appropriate the attenuation.

Water consumption

Internal potable water use will be limited through the specification of low flow fittings and dual flush toilets. All white goods provided will have maximum water efficiency ratings.

The following specifications will be considered in order to meet the water consumption target:

- Basin Taps - 5l/min
- WCs – 5/2.6 litre flush
- Kitchen taps – 7.5l/min

Construction site impacts

The construction site will be managed in such a way that the environmental impact is controlled and minimised. Best practice guidelines for preventing water pollution will be followed on site.

7.1.8 Light pollution

The development is in a highly urbanised location, and therefore will significantly not contribute to increasing the effects of light pollution.

The design team will follow the appropriate ILE design guidance with a view to achieving compliance.

7.1.9 Waste and recycling

Site waste management

A construction site resource management plan will be developed and implemented to ensure that construction site waste is effectively reduced and recycled, including designing waste out from the initial stages. Material ordering control and modern construction methods will be employed to minimise the potential for waste on site.

Waste will either be segregated on site into at least 5 different streams for recycling or collected, sorted and recycled by an external recycling contractor. Re-use of construction waste will also be encouraged. The site waste management plan will also ensure that hazardous waste is properly managed.

Operational waste management

The recycling of operational waste once the building is occupied will also be encouraged through the provision of recycling facilities and dedicated internal and external storage for recyclable materials, separate to those for domestic refuse.

7.1.10 Amenity, environmental quality, daylight and sunlight

The impact on sunlight and daylight to the surrounding buildings is expected to be minimal and is subject to a separate report.

There are limited opportunities to incorporate landscaping and habitat creation into the development, which is on a constrained site in a highly urbanised location.

The design team are proposing a landscaped central courtyard and a suitably qualified ecologist will be employed to assess the site as existing and to report on opportunities for a general enhancement of site ecology in conjunction with a long term strategy for maintenance with appropriate landscaping proposals.

The project will be required to be formally assessed against the BRE's environmental assessment method (BREEAM) and achieve a minimum rating of BREEAM "Very Good".

7.2 Domestic Accommodation

The Code for Sustainable Homes (the Code) was the national standard for the sustainable design and construction of new homes.

This was formally withdrawn by DCLG, and planning authorities are no longer able to require developments to meet the technical guidance within the Code for Sustainable Homes

However, the applicants do acknowledge some requirements of the Code, and intend to incorporate the following measures in order to underline the suitability credentials of the proposed development

- Water use - Ensuring that internal wholesome water use will be limited to 105 litres/person/day.
- SuDs – the existing site is 100% building and hard standing, with the introduction of new SuDs strategies, surface water run-off will be reduced.
- Waste and recycling – appropriate internal and external storage space will be provided to ensure that residents can sort, store and dispose of waste and recyclable materials.
- The principle contractor will be required to produce a site waste management plan and sustainable procurement plan, to ensure the use of responsibly sourced materials and to ensure that construction waste sent to landfill is kept to a minimum.
- The contractor will also produce a construction management plan highlighting best practice construction site standards to avoid the potential for air (dust) pollution, ground water pollution or indeed, noise pollution.

- An energy display devices will be provided for the flat. These would monitor the electrical consumption and heating fuel of the flat.
- The proposal would include a minimum of 4m of drying line in the bathroom which would be a heated space with controlled intermittent extract ventilation. Extract ventilation would achieve a minimum of 30l/s.
- Only appliances with a Minimum "A" rating to be installed - typically these would be a washer/dryer, a fridge/freezer and a dishwasher.

8.0 Conclusions

This report has detailed the baseline energy requirements for the proposed development, the reduction in energy demand as a result of energy efficiency measures and the potential to achieve further CO₂ reductions using renewable energy technologies.

The baseline results have shown that if the development was built to a standard to meet only the minimum requirements of current building regulations, the total amount of CO₂ emissions would be **18323Kg/year**.

Following the introduction of passive energy efficiency measures into the development, as detailed in section 4, the total amount of CO₂ emissions would be reduced to **15213Kg/year**, a reduction of **16.97%**.

There is also a requirement to reduce CO₂ emissions across the development using renewable or low-carbon energy sources. Therefore the report has considered the feasibility of the following technologies:

- Wind turbines
- Solar hot water
- Photovoltaic systems
- Biomass heating
- CHP (Combined heat and power)
- Ground & Air source heating

The results of the assessment of suitable technologies relative to the nature, locations and type of development suggest that the most suitable solution to meeting reduction in CO₂ emissions would be via the use of a 6.93Kwp PV array at roof top level and VRF heating and heating/cooling for the residential and retail spaces respectively.

This has been used in the final BRUKL/SAP models (reproduced at **Appendix C**) for the development which have also been detailed above in Table 5, which show a final gross emission level of **9014Kg/year**, representing a total reduction in emission over the baseline model, taking into account unregulated energy, of **50.80%**.

In addition, the BRUKL/SAP outputs demonstrate that the building achieves an overall improvement in emissions over the Building Regulations Part L standards for regulated emissions of minimum of **68.55%**.

Tables 6 - 10 Demonstrate how the 807 High Road project complies with the London Plan requirements and the new GLA guidance relating to zero carbon development.

Table 6 – Carbon Emission Reductions – Domestic Buildings

Key	Tonnes/annum
Baseline CO ₂ emissions (Part L 2013 of the Building Regulations Compliant Development)	10.64
CO ₂ emissions after energy demand reduction (be lean)	8.56
CO ₂ emissions after energy demand reduction (be lean) AND heat network (be clean)	8.56
CO ₂ emissions after energy demand reduction (be lean) AND heat network (be clean) AND renewable energy (be green)	3.02

Table 7 – Regulated Emissions Savings – Domestic Buildings

	Regulated Carbon Dioxide Savings	
	(Tonnes CO ₂ per annum)	%
Savings from energy demand reduction	2.08	19.55
Savings from heat network	0.00	0.00
Savings from renewable energy	5.54	52.07
Total Cumulative Savings	7.62	71.62
	(Tonnes CO ₂)	
Carbon Shortfall	3.02	
Cumulative savings for off-set payment	90.6	
Cash-in-lieu Contribution	£5,436.00	

Table 8 – Carbon Emission Reductions – Non-domestic Buildings

Key	Tonnes/annum
Baseline CO ₂ emissions (Part L 2013 of the Building Regulations Compliant Development)	2.94
CO ₂ emissions after energy demand reduction (be lean)	0.00
CO ₂ emissions after energy demand reduction (be lean) AND heat network (be clean)	1.87
CO ₂ emissions after energy demand reduction (be lean) AND heat network (be clean) AND renewable energy (be green)	1.25

Table 9 – Regulated Emissions Savings – Non-domestic Buildings

	Regulated Carbon Dioxide Savings	
	(Tonnes CO ₂ per annum)	%
Savings from energy demand reduction	1.07	36.39
Savings from heat network	0.00	0.00
Savings from renewable energy	0.62	21.09
Total Cumulative Savings	1.69	57.48
	(Tonnes CO ₂)	
Carbon Shortfall	-0.81	
Cumulative savings for off-set payment	N/A	
Cash-in-lieu Contribution	N/A	

Table 10: Site wide regulated carbon dioxide emissions and savings

	Total regulated emissions (Tonnes CO2/year)	CO2 savings (Tonnes CO2/year)	Percentage Saving (%)
Part L 2013 Baseline	13.58		
Be Lean	10.47	3.11	22.90
Be Clean	0.00	0.00	0.00
Be Green	4.27	9.31	68.56
		CO2 savings off-set (Tonnes CO2)	
Off-Set		£5,436.00	

In summary, the proposals would:

1. Achieve zero carbon through on-site measures alongside carbon offset payments, therefore satisfying both the London Plan and Haringey Strategic Policies
2. Achieve an on-site reduction of 68.56% beyond Building Regulations 2013, complying with London Plan Requirements
3. Achieve a minimum of BREEAM Very Good for all non-residential areas in accordance with Strategic Policy SP4
4. Be designed to facilitate a future DEN connection

Appendix A

Baseline/Un-regulated Energy Use:-

SAP/BRUKL Outputs & Target Emission Rates

Appendix B

Energy Efficient Design:-

SAP/BRUKL Outputs & Building Emission Rates

Appendix C

Generating energy on-site:-

Final BRUKL & SAP Outputs & Building Emission Rate

Appendix D

SAP10

GLA SAP10 Conversion Spreadsheet

Appendix E

CIBSE TM59

Overheating Analysis and Report