



Technical Analysis – Energy Use Intensity Calculation

Corner of Maryland Road and High Road
London
N22 5AR

25/07/2024

Document Status

Client: B.U Investments Ltd

Site: Corner of Maryland Road and High Road

Proposals: The construction of 6No. apartments

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1 Executive Summary

This report has been prepared in support of the planning application only for the construction of the proposed development which comprises 6 new build flats at the land on the corner of Maryland Road and High Road in London.

In order to assess against the LETI targets, we have modelled the Space Heat Demand, Operational Energy and Thermal Comfort of the development, below we have highlighted our findings.

Assessment Findings:

- Space Heating Demand – Between 6.4 and 9.8 kWh/m²
- Energy Use Intensity – Between 51.1 and 58.6 kWh/m²

It is proposed that for each flat a 2.4kWp photovoltaic system is installed. These systems were found to contribute as much as 39.8kWh/m² towards the energy demands.

It is important to note that with any modelling exercise there are assumptions and approximations that have to be made. As far as possible, details of all assumptions and approximations are supplied within the report. These were predominantly informed by information provided by Sleep Design Studio Architects.

Overview of Design Parameters	
Roof	0.10 (W/m ² K)
Floor	0.11 (W/m ² K)
Wall	0.17 (W/m ² K)
Windows and Roof lights	1.20 (W/m ² K) –Glazing G value 0.35
Internal Walls	0.0 (W/m ² K)
Heating	ASHP
Hot Water	ASHP (Water Consumption 50L PerPerson/PerDay)
Ventilation & Cooling	MVHR
Lighting	100% LED (no auto controls)
Air Leakage	3.5 m ³ (h.m ²)
Overall PSI Value Thermal Bridging	0.05

2 Introduction

The development site is located on the corner of Maryland Road and High Road, London.

The development proposals are for the demolition of the existing building, and the construction of a new building (including lower ground floor) to comprise 6no. flats.

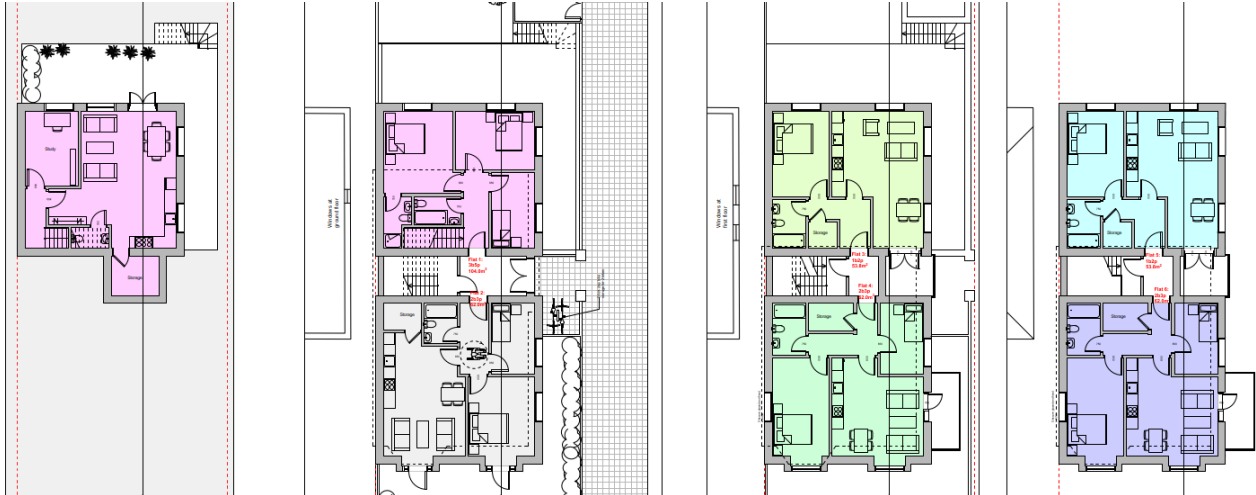


Table 01: Units Analysed at the proposed development

Unit Reference	Level	Description
Flat 1	Basement/Ground	3 bed, 5 person Apartment
Flat 2	Ground	2 bed, 3 person Apartment
Flat 3	First	1 bed, 2 person Apartment
Flat 4	First	2 bed, 3 person Apartment
Flat 5	Second	1 bed, 2 person Apartment
Flat 6	Second	2 bed, 3 person Apartment

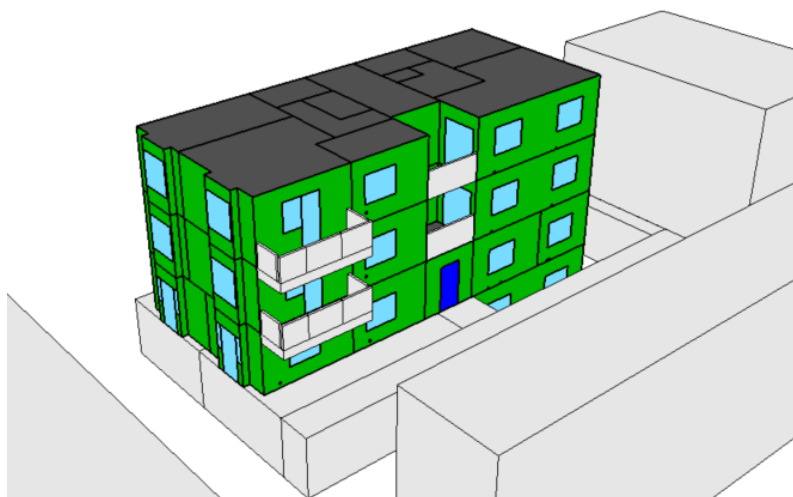


Figure 02.- DesignBuilder Model of proposed development

3 What is LETI?

The London Energy Transformation Initiative (LETI) was established in 2017 to support the transition of the capital's built environment to net zero carbon, providing guidance that can be applied to the rest of the United Kingdom (UK).

We are in a climate emergency, and urgently need to reduce carbon emissions. Here in the UK, 49% of annual carbon emissions are attributable to buildings. Over the next 40 years, the world is expected to build 230 billion square metres of new construction adding the equivalent of Paris to the planet every single week – so we must act now to meet the challenge of building net zero developments. LETI, along with others such as the World Green Building Council and Architecture 2030, believe that in order to meet our climate change targets all new buildings must operate at net zero carbon by 2030 and all buildings must operate at net zero carbon by 2050. This document provides practical solutions to set out a definitive journey, beyond climate emergency declarations, into a net zero future. To this end, the solution to meeting our climate change targets must be:

- Scalable: Energy consumption targets are set so that there is enough renewable energy to power all buildings in the UK.
- Achievable: A comprehensive modelling study has been undertaken, and in-use data from buildings have been analysed, so that the targets, while ambitious to achieve, are deemed achievable for most projects.
- Verifiable: Targets are measured in-use.
- Whole Life: Embodied carbon and operational carbon must both be considered.

The built environment industry, together with current regulations and practices, are seriously lagging behind the carbon trajectory required to protect life on planet earth. Everyone's future is at stake. As an industry we must be absolutely confident that all new buildings can operate at net zero carbon from 2030.

In order to achieve this, LETI believes that by 2025, 100 percent of new buildings must be designed to deliver net zero carbon, and the whole construction industry will need to be equipped with the knowledge and skills necessary. To set us on this trajectory, LETI believes that in 2020, 10 percent of all new buildings need to be designed to deliver net zero carbon.

The LETI EUI and space heating demand targets for residential buildings are as follows:

Energy Use Intensity	Space Heating Demand
35 kWh/m ² /year	15 kWh/m ² /year

4 Design Criteria

4.1 Fabric Performance

For the proposed development, we have used the following fabric U-values:

Design Measures to be Incorporated	
Element	U-Values and G Value (W/m ² K)
Roof	0.10
Floor	0.11
Wall	0.17
Windows (including curtain wall) and Roof lights	1.20
Internal Walls	0.00

4.2 Efficiency Measures

The following efficiency measures have been modelled:

Design Measures to be Incorporated	
Air tightness (m ³ / (h m ²) @ 50Pa)	3.5
Thermal Bridging	0.05
G-value	0.35

4.3 Heating and Hot Water

The heating and hot water are to be provided by an Air Source Heat Pump which follows the LETI guidance to ensure heating and hot water generation is fossil fuel free.

Heating and hot water

Implement the following measures:



Fuel

Ensure heating and hot water generation is fossil fuel free



Heating

Maximum 10 W/m² peak heat loss (including ventilation)



Hot water

Maximum dead leg of 1 litre for hot water pipework

'Green' Euro Water Label should be used for hot water outlets (e.g.: certified 6 L/min shower head – not using flow restrictors).

Design Measures to be Incorporated	
Fuel	All Electric
Heating	ASHP
Hot Water	ASHP
Shower	6L/min Green Euro Water Label

5 Internal Gains, Occupation, Hot Water Usage, Heating and Ventilation

5.1 Internal Gains, Occupation

Space	Occupancy	Occupied Hours (5 Days Week)	Sensible Heat Gain (W)	Lighting (W/m ²) 18:00-23:00	Plug in Equipment (W/per hour)
Living/Kitchen	2-3 People (1 and 2 Bedroom properties) 5 People for 3 Bed Properties	9:00-16:00	90	2	105 (1 and 2 Bed) 140 (3 Bed)
Double Bedrooms	2 People	22:00-07:00	90	2	13.8
Single Bedrooms	1 Person	22:00-07:00	90	2	6.8
Bathroom	N/A	N/A	N/A	2	0
Hall/Landing/Stores	N/A	N/A	N/A	2	0

5.2 Plug in equipment

Space	Equipment	Usage 3 Bed
Kitchen / Living	Oven – 970W (0.485) Hob – 725W (0.360) Fridge Freezer – 32W (0.768) Microwave – 900W (0.9) Kettle – 110W Per Cycle (0.33) TV – 60W (0.24) Laptop – 100W (0.2) W/Machine – 800W Per Cycle (0.4) Router – 10W (0.24)	30 mins 30 mins All day 2 cycle a day 3 cycles a day 4 hours 2 hours 0.5 cycle All day
Main Bedrooms	2 x Lamp – 7W 2 x Phone Charger – 10W 1 Hair Dryer 1200W	1 Hour 8 Hours 10 Mins
Additional Bedrooms	Lamp – 7W Phone Charger – 10W	1 Hour 4 Hours
Bathroom	N/A	N/A
Hall/Landing/Stores	N/A	N/A

5.3 Heating and Ventilation

Space	Heating Set Point	Heating Times	Ventilation
Living/Kitchen	21°C	06:00 – 22:00 (2 Days) 06:00-09:00 & 17:00 -22:00 (5 Days)	Supply and extract – 13 l/s on continuously. Boosted to 30 l/s when cooling activated
Bedrooms	21°C	06:00 – 22:00 (2 Days) 06:00-09:00 & 17:00 -22:00 (5 Days)	Supply 6/s on continuously Boosted to 20 l/s when cooling activated
Bathroom	21°C	06:00 – 22:00 (2 Days) 06:00-09:00 & 17:00 -22:00 (5 Days)	Extract 8l/s on continuously
Hall/Landing/Stores	21°C	06:00 – 22:00 (2 Days) 06:00-09:00 & 17:00 -22:00 (5 Days)	N/A

5.4 Hot Water Usage

50L per person per day

Appliance	Flowrate / Capacity
Bath	200L to overflow
Shower	6L @ 3 Bar 'Green' Euro Water Label should be used for hot water outlets
WHB Taps	3L @ 3Bar
Kitchen Taps	5L @ 3Bar

6 EUI Results

To meet compliance with LETI standards the Energy Use Intensity (EUI) must be below 35 kWh/m²/year excluding renewable contributions and the space heating demand must be below 15kWh/m²/year. The results are detailed in the tables below:

5.1 Flat 1

	Pumps and fans (kWh)	Service Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Interior Lighting (kWh)	Space Cooling (kWh)	Total	PV Generation (kWh)
Jan 01-31	60.3	133.2	184.3	121.1	44.4	0.0	543.3	-65.0
Feb 01-28	54.4	122.3	160.6	109.4	40.1	0.0	486.8	-87.0
Mar 01-31	60.2	139.2	136.1	121.1	44.3	0.0	500.8	-149.0
Apr 01-30	58.4	129.7	129.7	117.2	43.0	0.0	477.9	-236.0
May 01-31	60.3	133.2	9.5	121.1	44.4	0.0	368.5	-301.0
Jun 01-30	58.2	135.6	8.3	117.2	42.9	0.0	362.2	-280.0
Jul 01-31	60.3	133.2	0.3	121.1	44.4	0.0	359.4	-297.0
Aug 01-31	60.2	136.2	0.2	121.1	44.4	0.0	362.1	-274.0
Sep 01-30	58.3	132.7	4.1	117.2	42.9	0.0	355.1	-196.0
Oct 01-31	60.3	133.2	41.3	121.1	44.4	0.0	400.4	-135.0
Nov 01-30	58.3	132.7	141.3	117.2	42.9	0.0	492.3	-76.0
Dec 01-31	60.2	136.2	191.7	121.1	44.4	0.0	553.6	-45.0
Summed total	709.5	1597.2	1007.2	1426.2	522.4	1.05	5,262.5	-2,141
EUI (kWh/m ²)							51.1	-20.8
Space Heating Demand (kWh/m ²)							9.8	-

5.2 Flat 2

	Pumps and fans (kWh)	Service Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Interior Lighting (kWh)	Space Cooling (kWh)	Total	PV Generation (kWh)
Jan 01-31	33.9	80.1	98.8	108.1	22.4	0.0	343.3	-65.0
Feb 01-28	30.7	73.7	84.7	97.6	20.4	0.0	307.2	-87.0
Mar 01-31	34.1	83.7	67.5	108.1	22.7	0.0	316.1	-149.0
Apr 01-30	32.8	78.0	59.2	104.6	21.7	0.0	296.3	-236.0
May 01-31	33.9	80.1	0.0	108.1	22.4	0.0	244.5	-301.0
Jun 01-30	33.0	81.6	0.0	104.6	22.0	0.0	241.2	-280.0
Jul 01-31	33.9	80.1	0.0	108.1	22.4	0.0	244.5	-297.0
Aug 01-31	33.9	81.9	0.0	108.1	22.6	0.0	246.4	-274.0
Sep 01-30	32.9	79.8	0.0	104.6	21.9	0.0	239.1	-196.0
Oct 01-31	33.9	80.1	8.1	108.1	22.4	0.0	252.6	-135.0
Nov 01-30	32.9	79.8	64.5	104.6	21.9	0.0	303.7	-76.0
Dec 01-31	34.0	81.9	101.1	108.1	22.6	0.0	347.6	-45.0
Summed total	399.9	960.7	484.1	1272.6	265.5	0.0	3,382.7	-2,141.0
EUI (kWh/m ²)							54.6	-34.5
Space Heating Demand (kWh/m ²) (SAP)							7.8	-

5.3 Flat 3

	Pumps and fans (kWh)	Service Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Interior Lighting (kWh)	Space Cooling (kWh)	Total	PV Generation (kWh)
Jan 01-31	19.5	70.0	73.4	106.4	20.1	0.0	289.4	-65.0
Feb 01-28	17.7	63.3	56.6	96.1	18.2	0.0	251.9	-87.0
Mar 01-31	19.7	70.0	44.9	106.4	20.3	0.0	261.3	-149.0
Apr 01-30	18.9	67.8	39.7	103.0	19.5	0.0	248.8	-236.0
May 01-31	19.5	70.0	1.3	106.4	20.1	0.0	217.3	-301.0
Jun 01-30	19.1	67.8	0.0	103.0	19.7	0.0	209.5	-280.0
Jul 01-31	19.5	70.0	0.0	106.4	20.1	0.0	216.0	-297.0
Aug 01-31	19.6	70.0	0.0	106.4	20.2	0.0	216.2	-274.0
Sep 01-30	18.9	67.8	0.3	103.0	19.6	0.0	209.5	-196.0
Oct 01-31	19.5	70.0	2.4	106.4	20.1	0.0	218.4	-135.0
Nov 01-30	18.9	67.8	43.1	103.0	19.6	0.0	252.4	-76.0
Dec 01-31	19.6	70.0	81.9	106.4	20.2	0.0	298.2	-45.0
Summed total	230.3	824.5	343.6	1252.9	237.6	0.0	2,888.9	-2,141.0
EUI (kWh/m ²)							58.6	-39.8
Space Heating Demand (kWh/m ²) (SAP)							6.4	-

5.4 Flat 4

	Pumps and fans (kWh)	Service Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Interior Lighting (kWh)	Space Cooling (kWh)	Total	PV Generation (kWh)
Jan 01-31	33.9	80.1	86.3	108.1	22.3	0.0	330.7	-65.0
Feb 01-28	30.7	73.7	74.1	97.6	20.0	0.0	296.2	-87.0
Mar 01-31	34.1	83.7	62.6	108.1	24.4	0.0	312.9	-149.0
Apr 01-30	32.8	78.0	61.3	104.6	23.6	0.0	300.3	-236.0
May 01-31	33.9	80.1	4.5	108.1	24.3	0.0	250.9	-301.0
Jun 01-30	33.0	81.6	0.0	104.6	23.6	0.0	242.8	-280.0
Jul 01-31	33.9	80.1	0.0	108.1	24.3	0.0	246.4	-297.0
Aug 01-31	33.9	81.9	0.0	108.1	24.4	0.0	248.3	-274.0
Sep 01-30	32.9	79.8	0.0	104.6	23.6	0.0	240.9	-196.0
Oct 01-31	33.9	80.1	3.4	108.1	24.3	0.0	249.8	-135.0
Nov 01-30	32.9	79.8	50.4	104.6	23.6	0.0	291.2	-76.0
Dec 01-31	34.0	81.9	94.2	108.1	24.4	0.0	342.6	-45.0
Summed total	399.9	960.7	436.8	1272.6	282.8	0.0	3,352.7	-2141.0
EUI (kWh/m ²)							54.1	-34.5
Space Heating Demand (kWh/m ²) (SAP)							7.0	-

5.3 Flat 5

	Pumps and fans (kWh)	Service Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Interior Lighting (kWh)	Space Cooling (kWh)	Total	PV Generation (kWh)
Jan 01-31	19.5	70.0	95.8	106.4	20.1	0.0	311.8	-65.0
Feb 01-28	17.7	63.3	74.6	96.1	18.2	0.0	269.9	-87.0
Mar 01-31	19.7	70.0	60.1	106.4	20.3	0.0	276.5	-149.0
Apr 01-30	18.9	67.8	52.8	103.0	19.5	0.0	261.9	-236.0
May 01-31	19.5	70.0	0.0	106.4	20.1	0.0	216.0	-301.0
Jun 01-30	19.1	67.8	0.0	103.0	19.7	0.0	209.5	-280.0
Jul 01-31	19.5	70.0	0.0	106.4	20.1	0.0	216.0	-297.0
Aug 01-31	19.6	70.0	0.0	106.4	20.2	0.0	216.2	-274.0
Sep 01-30	18.9	67.8	0.2	103.0	19.6	0.0	209.4	-196.0
Oct 01-31	19.5	70.0	5.2	106.4	20.1	0.0	221.2	-135.0
Nov 01-30	18.9	67.8	61.1	103.0	19.6	0.0	270.3	-76.0
Dec 01-31	19.6	70.0	105.3	106.4	20.2	0.0	321.5	-45.0
Summed total	230.3	824.5	455.1	1252.9	237.6	0.0	3,000.4	-2,141.0
EUI (kWh/m ²)							55.8	-39.8
Space Heating Demand (kWh/m ²) (SAP)							8.5	-

5.4 Flat 6

	Pumps and fans (kWh)	Service Water Heating (kWh)	Space Heating (kWh)	Other Process (kWh)	Interior Lighting (kWh)	Space Cooling (kWh)	Total	PV Generation (kWh)
Jan 01-31	33.9	80.1	122.2	108.1	22.3	0.0	366.5	-65.0
Feb 01-28	30.7	73.7	99.1	97.6	20.0	0.0	321.1	-87.0
Mar 01-31	34.1	83.7	76.0	108.1	24.4	0.0	326.3	-149.0
Apr 01-30	32.8	78.0	73.2	104.6	23.6	0.0	312.2	-236.0
May 01-31	33.9	80.1	2.0	108.1	24.3	0.0	248.4	-301.0
Jun 01-30	33.0	81.6	0.8	104.6	23.6	0.0	243.5	-280.0
Jul 01-31	33.9	80.1	0.0	108.1	24.3	0.0	246.4	-297.0
Aug 01-31	33.9	81.9	0.0	108.1	24.4	0.0	248.3	-274.0
Sep 01-30	32.9	79.8	0.3	104.6	23.6	0.0	241.2	-196.0
Oct 01-31	33.9	80.1	1.9	108.1	24.3	0.0	248.3	-135.0
Nov 01-30	32.9	79.8	78.4	104.6	23.6	0.0	319.3	-76.0
Dec 01-31	34.0	81.9	131.6	108.1	24.4	0.0	380.0	-45.0
Summed total	399.9	960.7	585.4	1272.6	282.8	0.0	3,501.4	-2141.0
EUI (kWh/m ²)							56.5	-34.5
Space Heating Demand (kWh/m ²) (SAP)							9.4	-