Sustainable Energy Statement

Flats 1 – 3
Tapping the Admiral
Castle Road
Camden
NW1 8SU

Amendments

Date	Change	Document Version
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This sustainable energy statement has been prepared for Camden Council on behalf of:

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Flats 1 – 3
Tapping the Admiral
Castle Road
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NW1 8SU

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EXECUTIVE SUMMARY

Ashby Energy Assessors Ltd were appointed to undertake an energy assessment of the proposed development at Flats 1 – 3, Tapping the Admiral, Castle Road, Camden NW1 8SU

The works include the renovation of the first floor and above of the existing building which are to be turned into flats and the addition of a new top floor element for flat 3.

The property faces North onto Castle Road. The ground floor area of the flats is
Flat 1 =72.3 m^2
Flat 2 =41.7 m^2
Flat 3 =81.7 m^2

In total 195.7 m^2 over all the storeys. Details of the floor layout plans can be found in Appendix A.

The report shows that compliance with building regulations approved document L1B will be achieved.

The Carbon Emission for the building, will be 24.83% lower than the Baseline Emissions based on 2010 building regulations, therefore satisfying the planning requirement.

The energy assessment has been carried out using the methodology outlined in planning policy. The London Plan energy Hierarchy is as follows:-

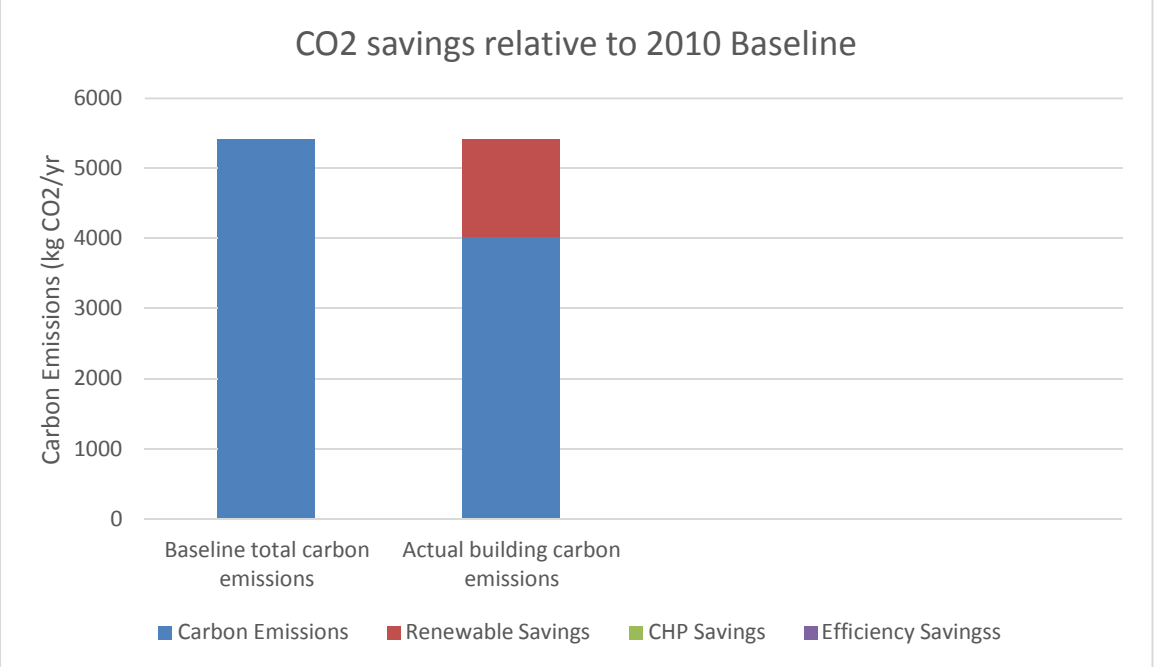
1. Be lean: use less energy
2. Be clean: supply energy efficiently
3. Be green: use renewable energies

This energy assessment sets out to demonstrate how this approach has been used in order to achieve the required targets in carbon reduction.

The summary of the findings are: -

	Energy Demand 'Taken from SAP Worksheet item 211 - 232' (kWh/yr)	Energy Consumption Saving (%)	CO2 emissions 'Taken from SAP Worksheet item 272' (kg CO2/yr)	CO2 emissions Saving (%)
2010 Compliant baseline (Combined)	24,281.87		5,411.53	
Proposed scheme after energy efficiency measures	23,312.04	-3.99%	5,397.99	-0.25%
Proposed scheme after CHP savings	23,312.04	-3.99%	5,397.99	-0.25%
Proposed scheme after renewables	20,748.67	-14.55%	4,067.58	-24.83%

The carbon emissions above are the combination of all the flats combined



1.0 INTRODUCTION

This report summarises the sustainable design stage considerations for the proposed development at The Tapping of the Admiral, Flats 1 – 3 and describes the function of the proposed building works. The report conducts a renewable, low carbon technology review.

The analysis of the energy usage is based on the government approved national calculation method – SAP, Standard Assessment procedure

This document has been prepared for the Camden Council to address the carbon reduction requirement as stipulated in planning policy. The target for a domestic development is a reduction in carbon emissions of 20% versus the 2010 building regulations baseline.

The development has been assessed as four separate flats and considers both planning and building regulations requirements.

The aim of this report is to offer preliminary estimations of energy savings using a range of appropriate energy efficiency measures and consideration of renewable technologies that could be incorporated into the design to meet current legislation and the council's aspirations in reducing carbon emissions to combat climate change are suggested.

Using the London Plan energy Hierarchy as follows:-

1 Be lean: use less energy
2 Be clean: supply energy efficiently
3 Be green: use renewable energies

Property Summary
The property faces North onto Castle Road. The ground floor area of the flats is
Flat 1 =72.3 m^2
Flat 2 =41.7 m^2
Flat 3 =81.7 m^2

In total 195.7 m^2over all the storeys. Details of the floor layout plans can be found in Appendix A.

2.0 DESIGN REQUIREMENTS AND ENERGY EFFICIENCY

2.1 BASELINE TARGET BUILDING EMMISIONS RATE

The baseline building represents a development that meets the minimum standards of CO2 emissions. (i.e. the dwelling emissions rate DER = Target emission rate TER L1B) as defined in building regulation part L.

The SAP TER / DER calculation process includes all regulated energy (i.e. heating, hot water lighting and pumps and fans) but does not include unregulated energy such as equipment. For this calculation the unregulated energy is not included.

For this development the target emissions equivalent to the TER is 5,411.53 Kg CO2/yr as shown in table 1 below: -

Table 1: Part-L1 England Building Regulations Check

kgCO2/year

Flat	Space Heating (kgCO2/year)	Water Heating (kgCO2/year)	Pumps, fans and electric Keep-hot (kgCO2/year)	Lighting (kgCO2/year)	Total (kgCO2/year)
1	1414.23	495.95	90.48	264.18	2,264.84
2	604.87	329.38	90.48	137.28	1161.99
3	1414.23	495.95	90.48	264.18	2,264.84
					5,691.67

Energy Consumption kWh/year

Flat	Space Heating (kWh/Year)	Water Heating (kWh/Year)	Pumps, fans and electric Keep-hot (kWh/Year)	Lighting (kWh/Year)	Total (kWh/Year)
1	7142.57	2504.8	175	510.98	10,333.35
2	3054.88	1663.51	175	265.53	5,158.92
3	7142.57	2504.8	175	510.98	10,333.35
					25,825.62

The above information is an extract from the SAP worksheet 2009 items 261 – 268

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2.2 BE LEAN – USE LESS ENERGY

The London energy hierarchy requires that the development is designed in a way to use less energy before considering any centralised heat or renewables.

The design of this building allows for natural light to benefit the property to ensure minimum use of energy for lighting and working within the constraints of the site, however very efficient low energy lighting will be used throughout the building and specific glazing u-value will need to be achieved.

The majority of the building will be insulated to levels above the present building regulations standards (details shown in table 2 below). The only exception to this is the wall to the unheated corridors and the new wall to the flat 3, however, improvements above minimum building regulations has been made to the existing external wall and floor as compensator action. Ventilation will be supplied by natural ventilation.

As the building is of multi-storey construction, it has good thermal mass with a good ratio of external wall and roof area to useable floor area. The floor area has been maximised within the constraints of the site.

With regard to improving the insulation of the building fabric over and above the minimum current U value requirements of the Building Regulations, Part L. The buildings shall be designed with fabric U values and efficiencies as follows: -

Table 2: Design Specification

	Current minimum building regulations, Part L1B requirement	Proposed Building	% improvement over part L1B minimum
Existing Solid Walls	0.30 W/m^{2}K	0.29 W/m^{2}K	-3.3%
New Wall to Flat 4 roof terrace area.	0.28W/m^{2}K	0.29 W/m^{2}K	+ 3.5%
Floors	0.25 W/m^{2}K	0.10 – 0.20 W/m^{2}K	- 60% - 20%
Flat Roof	0.18 W/m^{2}K	0.18 W/m^{2}K	0%
Windows	1.60 W/m^{2}K	1.60 W/m^{2}K	0%
Door to Corridors	1.80 W/m^{2}K	1.40 W/m^{2}K	- 22.2%
Lighting	75% low energy lighting	100% low energy lighting	-25%
Heating	88% Efficiency	89% Efficiency	-1%

Details of the full build standards can be found in appendix B

This specification gives an improvement in dwelling Emissions of 0.25% against the Baseline, reducing the actual dwelling Emissions to 5,397.99 Co2/m^2/yr as shown in table 3

Table 3: Part-L1 England Building Regulations Check

kgCO2/year

Flat	Space Heating (kgCO2/year)	Water Heating (kgCO2/year)	Pumps, fans and electric Keep-hot (kgCO2/year)	Lighting (kgCO2/year)	Total (kgCO2/year)
1	1620.8	533.25	38.93	199.39	2,392.37
2	598.85	355	38.93	103.61	1,096.39
3	1620.8	533.25	38.93	199.39	2392.37
					5,881.13

Energy Consumption kWh/year

Flat	Space Heating (kWh/Year)	Water Heating (kWh/Year)	Pumps, fans and electric Keep-hot (kWh/Year)	Lighting (kWh/Year)	Total (kWh/Year)
1	7503.68	2468.77	75	384.19	10,431.64
2	2772.43	1643.51	75	199.64	4,690.58
3	7503.68	2468.77	75	384.19	10,431.64
					25,553.86

The above information is an extract from the SAP worksheet 2012 items 261 – 268

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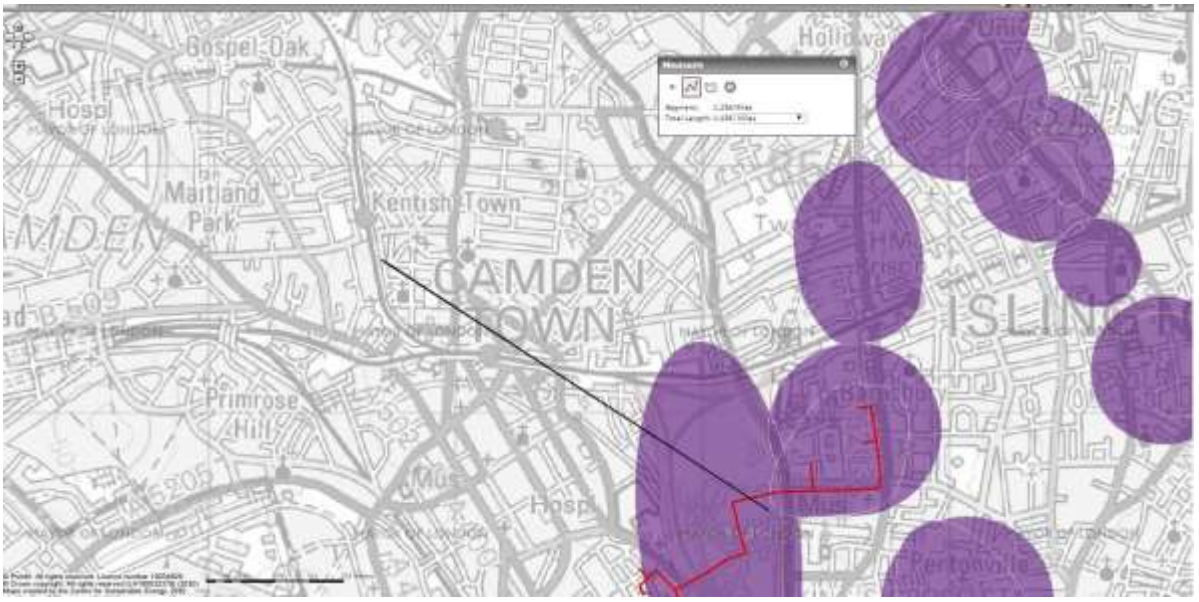
3.0 BE CLEAN – SUPPLY ENERGY EFFICIENTLY

Planning policy requires that the development considers the use of the London heat network or local decentralised systems.

The London heat network does run to the East of Camden but is approx. 1.15 miles away from this development



The London Heat network is not close to the development and the cost of extending it for a relatively small single development is high and the disruption to the residential location would be high.

Therefore, for these reasons it is proposed not to use the London heat network at this stage.

Planning Policy also requires developments to consider the use of Combined Heat and Power.

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.

Major development proposals should select energy systems in accordance with the following hierarchy:

1 Connection to existing heating or cooling networks
2 Individual wide CHP network
3 Communal heating

Item 1 - Connection to an existing heating or cooling network was not considered as existing heating or cooling network was not found in the locations area

Item 2 - Individual CHP is not considered suitable for the following reasons:

- The list of individual approved CHP systems are not designed for buildings this small therefore the heating efficiency of the CHP units for flats 1,2 and 3 is 75.22% and a hot water efficiency of 62.2%.

CHP	**Heating Efficiency**	**Hot Water Efficiency**
Flats 1,2 & 3 - EHE Whispergen EU1A	Plant size ratio 3.1 = **75.22%**	**62.2%**

Information extracted from the SEDBUK database

- In comparison, a normal mains gas combi boiler, for example, Ideal Logic ES boiler can achieve a heating efficiency of 89% and a hot water efficiency of 76.9%

Boiler	**Heating Efficiency**	**Hot Water Efficiency**
All Flats Fitted with – Ideal Logic ES Combi boilers	**89%**	**76.9%**

Information extracted from the SEDBUK database

- **Because of the above items the CHP has a negative impact on the development and will not aid the development in reducing its Carbon**

Item 3 - Communal heating and hot water.

As no managing company is to the allocated to the site a communal CHP is not been seen as suitable as their will be no overarching body to perform repairs and servicing to the boiler.

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3.1 SUMMARY

In summary, the London heat network does run to the East of Camden but is approx. 1.15 miles away from this development and therefore has is not a seen as a potential option.

The opportunity to installed individual CHP to each flat is also not suitable because this will result in a negative impact that does not aid the development in reducing its carbon.

In addition, the opportunity to installed a single CHP for the flats is also not suitable as no managing company is to the allocated to the site to perform repairs and servicing.

4.0 BE GREEN – USE RENEWABLE ENERGIES

In order to achieve the required reduction in carbon emissions the development will include renewable energies.

The following section considers each type of renewable energy and selects the most appropriate one for the development.

4.1 RENEWABLE / LOW CARBON TECHNOLOGY REVIEW.

The initial results from the SAP model were used to generate the annual energy consumption figures. These figures where then used to determine suitability of various renewable technologies to satisfy the reduction in energy within the building via a renewable source.

Items listed below were considered:

Photovoltaic cells. (PV):
Solar water heating:
Wind turbines:
Ground source heat technologies (GSHP)
Air source heat technologies (ASHP)
Biomass:
Hydro

PHOTOVOLTAICS (PV) – Suitable

Photovoltaic cells are panels you can attach to your roof or walls. Each cell is made from one or two layers of semiconducting material, usually silicon. There are a number of different types available e.g. panels, tiles cladding and other bespoke finishes.

When light shines on the PV cell it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced.

The top floor roof area of this building is flat therefore the panels can be placed south facing for maximum benefit. As the lower level roof areas are small these areas would not be included.

The installation of 3 kW, South Facing Photovoltaics will further reduce the carbon emissions by 4,067.58Kg Co2/yr (24.83%)

Therefore, PV is an option

SOLAR HOT WATER – Not Suitable

Solar water heating systems use solar radiation to heat water directly, usually for domestic hot water purposes. The installation of solar hot water would require a suitable hot water cylinder so it can pre heat the water.

However, the proposed building only consists of small flats, which, will all be using combination boilers. As combination boilers produce instant hot water without any hot water storage; Solar hot water would not be suitable for this type of set up.

WIND TURBINES – Not suitable.

The wind turns the blades of the turbine to produce electricity. Horizontal or vertical axis turbines are available.

The building is located in an urban area without especially beneficial topography. The close proximity to residences may have harmful noise effects which would be detrimental to the surrounding residents' enjoyment of their property. This would appear to indicate that this technology would not be suitable for this application and this option has been discounted.

HEAT PUMP TECHNOLOGIES

Ground Source Heat Pump (GSHP) – Not suitable

Ground source technologies make use of the heat from the ground to provide heating to the building. The heat is transferred from the ground by either extracting and discharging (re-charging) water from/to the ground directly (open loop) or circulating water through pipes buried within the ground, (closed loop). The water is passed through a heat pump, which uses electrical energy, in order to transfer the heat from this water into a higher temperature water circuit used for heating purposes.

There is not enough open ground area for GSHP pipes for the development and a bore hole is not considered appropriate in a built up area due to the possibility of drains, power supplies etc. plus the cost is significant. Both options have been discounted for these reasons.

AIR SOURCE HEAT PUMP (ASHP) – Suitable

Air source technologies make use of the heat from the air to provide heating to the building. An 'air to water' air source heat pump can provide hot water and space heating in a building.

For this building the installation of a heat pump with a COP of 3.5 for space heating will give a reduction in carbon emissions but not as good as the solar photovoltaics of solar thermal panels.

Therefore, although it is suitable the solar photovoltaics give a more beneficial reduction in carbon emissions.

BIOMASS – Not suitable

Use of biomass fuels to run biomass boilers.

The use of a large scale biomass boiler has been considered for heating and hot water.

The building has a relatively small external space and therefore does not lend itself a large scale biomass system. The development is located in an urban area which would be negatively impacted by the possible smoke emissions. There will also be a requirement for regular deliveries of fuel; however, this site has very limited parking/hard standing areas for biomass delivery vehicles. For all of the above reasons, biomass is not considered an appropriate LZC technology for this development.

HYDRO – Not Suitable

Hydropower is the renewable energy contained in flowing water. Electricity generated using hydropower is known as hydroelectricity.

No options available on site therefore, for the purposes of this exercise this option has been discounted.

RENEWABLE SUMMARY

The particular site constraints have meant that many of these technologies have been discounted, generally due to reasons of security, lack of space, inappropriate geography or expense compared to benefit.

However, it is proposed that a solution is sought from the installation of a solar photovoltaics system. The system will be fitted onto the top floor flat roof area. It will be positioned South facing for maximum benefit.

The installation of 3 kW, South Facing Photovoltaics will further reduce the carbon emissions by 4,328.99Kg Co2/yr (24.83%). See below

kgCO2/year

Flat	Space Heating (kgCO2/year)	Water Heating (kgCO2/year)	Pumps, fans and electric Keep-hot (kgCO2/year)	Lighting (kgCO2/year)	PV Reduction	Total (kgCO2/year)
1	1620.8	533.25	38.93	-665.19	-665.19	1727.17
2	598.85	355	38.93	103.61	-221.73	874.65
3	1620.8	533.25	38.93	199.39	-665.19	1727.17
						4,328.99

Energy Consumption kWh/year

Flat	Space Heating (kWh/Year)	Water Heating (kWh/Year)	Pumps, fans and electric Keep-hot (kWh/Year)	Lighting (kWh/Year)	PV Reduction	Total (kWh/Year)
1	7503.68	2468.77	75	384.19	-1281.68	9,149.96
2	2772.43	1643.51	75	199.64	-427.23	4,263.3
3	7503.68	2468.77	75	384.19	-1281.68	9,149.96
						22,563.22

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5.0 CONCLUSION.

The ambition for the development is to limit its environmental impact while achieving or exceeding all necessary statutory requirements.

In order to assist with this ambition, the building has been designed using good thermal values for walls, floor and roof areas and also glazing.

Although the London Heat Network will not be used photovoltaic solar panels will be installed to reduce carbon emissions.

Furthermore, the use of various renewable or low carbon technologies has been considered to contribute to the buildings energy load and reduce the buildings expected CO2 emissions. The particular site constraints have meant that many of these technologies have been discounted, generally due to reasons of security, lack of space, inappropriate geography or expense compared to benefit. However, it is proposed that a solution is sought from the installation of a South facing photovoltaics system located on the top floor flat roof area.

The Carbon Emission for the building will be 24.83% lower than the Baseline Emissions based on 2010 building regulations, therefore satisfies the planning requirement.

Appendix

A - Detailed Build Standards

Building Regulations Standards Table

Element	Specification	Proposed U Value	Standard U Value	Building Regs. Achieved
Renovated wall	External Brick 25 mm batten 60 mm rigid foam insulation which has conductivity of 0.022 W/mK Plasterboard	0.29 W/m^{2}K	0.30 W/m^{2}K	Yes.
New Wall	Brick out skin 100 mm mineral wool insulation which has conductivity of 0.038 Thermal block which has a which has conductivity of 0.18 Plasterboard	0.29 W/m^{2}K	0.28 W/m^{2}K	No
Wall to Corridor	100 mm Rockwool flexible sound insulation between timber studs	0.36 W/m^{2}K	0.28 W/m^{2}K	No
Party Wall	Fully fill party wall with sealed edges	0.00 W/m^{2}K	0.00 W/m^{2}K	Yes.
New Floor	200 mm mineral wool between timber joists	0.10 - 0.20 W/m^{2}K	0.25 W/m^{2}K	Yes
New flat roof	115 mm rigid foam timber joists	0.18 W/m^{2}K	0.18 W/m^{2}K	Yes
Heating	The New mains gas combi boilers fitted to each dwelling. Via underfloor heating – Time and temperature zone controls	89% mains gas boilers	88% mains gas boilers	Yes
Lighting	Low energy light	100% low energy light	75% low energy	Yes
Renewables	0.5 kWp of solar panels are required to flats 1,2 & 3 1.5 kWp of solar panels are required to flat 4 Providing a total of 3.0 kWp for the development	NA	NA	NA
Door	New Door	1.40 W/m^{2}K	1.80 W/m^{2}K	Yes
Windows	New windows U value	1.60 W/m^{2}K	1.60 W/m^{2}K	Yes
	New window g value	0.62	-	-

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