Sustainability/Energy Statement

2 New Flats and material change of use to 3nr Flats at 329 – 331 Kentish Town Rd Camden, NW5 2JU

Issue 2

Prepared for:
Atlas Property Letting & Services Ltd
155-157 Great Portland St,
W1W 6QP
London

Prepared by:
energylab Consulting Ltd
18 Wenlock road, London, N1 7TA
Tel: 020 37629608
www.energy-lab.co.uk

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1	4 Sep 20	Final Issue	Section 2.1 update the legend Section 7: updated the text	MA	DA	MA
2	22 Sep 20		Section 2.1: updated drawings			

energylab

18 Wenlock Road
London
N1 7TA
www.energy-lab.co.uk
info@energy-lab.co.uk
T 020 3752 9608

Content

1. EXECUTIVE SUMMARY

This Energy/Sustainability Statement was prepared by Energylab Consulting ltd in support of the full planning application for the proposed 2 new flats and the material change of use from the existing Sainsbury ancillary space to 3nr flats (flats 3, 4 and 5) at Kentish Town Rd Camden, NW5 2JU development, to comply with the London Borough of Camden Council's requirements on sustainability section.

The report confirms that the energy and carbon reduction strategy under the climate change mitigation measures proposed for this development are in line and in compliance with the relevant and applicable targets and requirement listed within the following planning polices of Camden Council and the London Plan:

- Camden Local Plan Policy CC1 Climate Change Mitigation (Sustainability and Climate Change) [1]
- The London Plan relevant planning policies within section 5, i.e. Energy Hierarchy
- Camden Planning Guidance Sustainability CPG3

The new build part of the development includes the creation of 2nr new flats over a total area of 214 sqm (Flats 1 and 2). While material change of use from the existing Sainsbury ancillary space to 3nr flats (flats 3, 4 and 5) will be carried out on the existing building.

The number and the total area of the new flats (Flat 1 and 2) does not fall under the Camden Local Plan CC1 threshold for CO2 emissions reduction via on site renewables target. Camden Plan CC1 threshold is for a development with at least 5 new flats with 500 sqm of total area.

The new build 2nr flats also does not fall under the London Plan description of Major Development. London Plan describes the development as Major if it involves 10 or more new dwellings or over 0.5 hectares of area.

Hence, the zero-carbon target reduction set within CC1 and the London Plan for Major Development is not applicable to this development.

However, the new build 2nr flats will minimise the effect of climate change and will meet the highest feasible environmental standards that are financially and technically viable. The new development shall reduce the carbon dioxide emissions through following the London Plan Energy Hierarchy to comply with the relevant Camden Local Plan CC1 CO2 emissions reduction target of at least 19% below the Part L 2013 Buildings Regulations.

The design team is also committed to achieve lower water usage targets (110 litres/person/day) and the sustainable use of materials where both commercially viable and technically possible.

Therefore, the report confirms that the development has the potential to comply with the following:

1. Camden Local Plan CC1 relevant CO2 emissions reduction target
2. Part L1A 2013 for the new build and Part L2B for the existing flats
3. London Plan Energy Hierarchy
4. The relevant items of Camden Planning CPG3

[1] Camden Local Plan Section 8 Policy CC1 Climate Change mitigation p_{249}

1.2 Reduction in Carbon Emissions Overview and Summary

1.2.1 New-build Flats

The energy strategy for the New-build flat (Flat 1&2) has been developed in line with the London Plan Energy Hierarchy principals to reduce the energy and associated CO_2 emissions using the "Be Lean, Be Clean, Be Green" approach:

- "Be Lean": Improvements to the building fabric and energy efficient services to minimize energy demand, including efficient building services such as high efficiency gas fired boiler and 100% low energy LED lightings.
- "Be Clean": The site is not suitable for a local CHP system or connection to a district network. Therefore, no carbon savings are possible using this measure.
- "Be Green": To meet the Camden Local Plan CC1 relevant CO2 emission reduction target of 19% over the Part L1A 2013 target, a number of PV panels shall be proposed to be installed on the flat roof.

Please see table below, the percentages reduction in CO_2 emissions shown below are for the new flats only and the improvements are shown against the notional building CO_2 emissions as per the Approved Document 2013 Part L1A:

	Regulated Carbon Dioxide Emissions New Domestic	
	(Tonnes CO_2 per annum)	(%)
Part L 2013 Target Emission	3.79	-
Savings from energy demand reduction (Be Lean)	3.87	-2.0%
Savings from Heat network/CHP (Be Clean)	-	-
Savings from renewable energy (Be Green)	3.04	+19.80%
Total Cumulative Savings	**0.70**	**19.80%**

1.2.2 Material change of use to 3nr flats (flats 3, 4 and 5)

To further reduce the energy and associated CO_2 emissions form the development as a whole, an improvement in the façade performance (including windows) is proposed for the retained part of the development within Flats 3, 4 and 5. These improvements shall be, where viable and technically feasible, in line with those performances listed within the **Approved Document Part L 1B**. Please see tables below:

Any new thermal elements –

Table 2 **Standards for new thermal elements**

Element[1]	Standard W/(m².K)[2]
Wall	0.28
Pitched roof – insulation at ceiling level	0.16
Pitched roof – insulation at rafter level	0.18
Flat roof or roof with integral insulation	0.18
Floors[3]	0.22[4]
Swimming pool basin	0.25

Notes:

1. 'Roof' includes the roof parts of dormer windows, and 'wall' includes the wall parts (cheeks) of dormer windows.
2. Area-weighted average values.
3. A lesser provision may be appropriate where meeting such a standard would result in a reduction of more than 5% in the internal floor area of the room bounded by the wall.
4. A lesser provision may be appropriate where meeting such a standard would create significant problems in relation to adjoining floor levels. The U-value of the floor of an extension can be calculated using the exposed perimeter and floor area of the whole enlarged dwelling.

Upgrading retained thermal elements –

Table 3 **Upgrading retained thermal elements**

Element[1]	(a) Threshold U-value W/(m²·K)[8]	(b) Improved U-value W/(m²·K)[8]
Wall – cavity insulation[2]	0.70	0.55
Wall – external or internal insulation[3]	0.70	0.30
Floor[4,5]	0.70	0.25
Pitched roof – insulation at ceiling level	0.35	0.16
Pitched roof – insulation between rafters[6]	0.35	0.18
Flat roof or roof with integral insulation[7]	0.35	0.18

1 'Roof' includes the roof parts of dormer windows and 'wall' includes the wall parts (cheeks) of dormer windows.

2 This applies only in the case of a wall suitable for the installation of cavity insulation. Where this is not the case, it should be treated as 'wall – external or internal insulation'.

3 A lesser provision may be appropriate where meeting such a standard would result in a reduction of more than 5% in the internal floor area of the room bounded by the wall.

4 The U-value of the floor of an extension can be calculated using the exposed perimeter and floor area of the whole enlarged building.

5 A lesser provision may be appropriate where meeting such a standard would create significant problems in relation to adjoining floor levels.

6 A lesser provision may be appropriate where meeting such a standard would create limitations on head room. In such cases, the depth of the insulation plus any required air gap should be at least to the depth of the rafters, and the thermal performance of the chosen insulant should be such as to achieve the best practicable U-value.

7 A lesser provision may be appropriate if there are particular problems associated with the load-bearing capacity of the frame or the upstand height.

8 Area-weighted average values.

Controlled fittings –

Control fitting are the windows and doors, including the frames.

Table 1 Standards for controlled fittings[1]

Fitting	Standard
Window, roof window or rooflight[2]	WER Band C or better (see paragraph 4.22), or U-value 1.6 W/(m².K)
Doors with >60% of internal face glazed	Doorset Energy Rating (DSER) Band E or better (see paragraph 4.22), or U-value 1.8 W/(m².K)
Other doors	DSER Band E or better (see paragraph 4.22), or U-value 1.8 W/(m².K)

Notes:

1. Since the U-values are determined for standard configurations (see paragraph 4.20), the effects of Georgian bars and/or leaded lights can be ignored.
2. For the purposes of checking compliance with this table, the true U-value based on aperture area can be converted to the U-value based on the developed area of the rooflight. Further guidance on evaluating the U-value of out-of-plane rooflights is given in Assessment of thermal performance of out-of-plane rooflights, NARM Technical Document NTD 2 (2010). See http://www.narm.org.uk/uploads/pdfs/NARM-TAOOPR-030311.pdf.

If any windows and doors are replaced or newly installed into an existing building, they should meet the minimum values as described in Table 1;

If just the glazing is replaced in a fitting as part of the work, then it is outside the scope of the Part 1B.

Controlled Services –

Any new services within the retained/refurbished flats shall be specified in line with the relevant performances listed within the *Domestic Building services Compliance Guide 2013.*

In general terms the requirements are that if an appliance is to be replaced, it should not have an efficiency of less than the current one. If is a new appliance it should meet the minimum required for efficiency and controls as set out in the Compliance Guide.

The guide is available from:
https://www.planningportal.co.uk/info/200135/approved_documents/74/part_l__conservation_of_fuel_and_power/2

2. INTRODUCTION

2.1 Project Description

The larger part of the development includes the existing building facing the Kentish Town Road where the material change of use from the existing Sainsbury ancillary space to 3nr flats 3, 4 and 5 are situated. The new build flats 1 and 2 shall be situated above the existing Sainsbury store facing York Mews.

Below image shows the *proposed* scheme layout throughout the building.

Existing/refurbish - Resi element

New - Resi element

2.2 Building Regulations & The London Plan Energy Hierarchy

This report demonstrate that the development has the potential to comply with following Building Regulations and legislations;

- Material change of use element – for this project this work will include the material change of use from the existing Sainsbury ancillary space to 3nr flats (flats 3, 4 and 5) facing Kentish Town Road. The design will, where viable and technically feasible,
    a) provide new fixed building services that meet minimum standards of energy efficiency and provide new HVAC systems with appropriate controls set out in *Domestic Building Services Compliance Guide 2013.*
    b) where an existing thermal element is part of the refurbishment works, the aim would be to upgrade those thermal elements with u values worse than the threshold value in column (a) of Table 3 (refer section 1.2.2) set out in Building Regulation Part L1B *Conservation of flue and power in existing dwelling* to achieve the u values given in Colum (b), provided this is technically functionally and economically feasible.

- New-build Resi element – Regulated CO_2 emission to meet the requirement of Building Regulation Part L1A 2013 *Conservation of flue and power in new dwellings*, i.e. to carry out SAP calculation;

This development does not fall under the London Plan and Camden council definition of Major Development as the new development is less than 1000sqm and 10 new residential units. The new build part of the proposed development is for 2 new flats (flats 1&2) with approximately 214sqm~ in area.

The energy strategies for the whole development has been developed in line with the London Plan energy hierarchy (the new build part of the development):

- "Be Lean": Improvements to the building fabric and energy efficient services to minimize energy demand, including efficient building services such as high efficiency gas fired boiler and 100% low energy LED lightings.
- "Be Clean": The site is not suitable for a local CHP system or connection to a district network. Therefore, no carbon savings are possible using this measure.
- "Be Green": To meet the Camden Local Plan CC1 relevant CO2 emission reduction target of 19% over the Part L1A 2013 target, a number of PV panels shall be proposed to be installed on the flat roof.

3. ESTABLISHING CO_2 EMISSIONS

3.1 New-build Flats

The energy and the associated CO_2 emissions calculations were carried out using the SAP Energy Software (Strome Certification FSAP 2012 version 1.0.4.26) which is an approved software for the Standard Assessment Procedure (SAP) calculations.

The Standard Assessment Procedure (SAP) is the UK Government National Calculation Methodology for assessing the energy performance of new dwellings under the European Directive on the Energy Performance of Buildings (EPBD).

For the new-build flats (1&2), the baseline CO_2 emissions are calculated from the 'notional' building using the Part L software tools. i.e. FSAP. The 'notional' building consists of standard set of fabric and services parameters which deliver the Target Emissions Rate (TER):

	Regulated Carbon Dioxide Emissions New Domestic
	(Tonnes CO_2 per annum)
Part L 2013 Target Emission	3.79

Details of the input to these calculations can be found in Appendix 2: Key Modelling Inputs.

3.2 Material change of use to 3nr flats (flats 3, 4 and 5)

Not Applicable.

4. ENERGY EFFICIENCY MEASURES (BE LEAN)

4.1 New-build Flats

4.1.1 Passive measures

U-values for *new* external elements for newly proposed flats have been improved from the minimum standards set out under Part L 1A, as shown in below table.

Fabric properties & Fabric Energy Efficiency Standard

New Elements	Proposed U Values	Part L Limiting values
Walls	0.12 **(W/m²/K)**	0.30 **(W/m²/K)**
Floors	0.13 **(W/m²/K)**	0.25 **(W/m²/K)**
Roof	0.13 **(W/m²/K)**	0.20 **(W/m²/K)**
Windows	0.8 **(W/m²/K)** (Triple Glazing) G value: 0.63	2.00 **(W/m²/K)**
Rooflights	1.2 **(W/m²/K)** (double glazing) G value: 0.63	2.00 **(W/m²/K)**
Solid door	1.0 **(W/m²/K)**	1 **(W/m²/K)** (used in Notional building)
Air tightness	3 **(m3 / (h. m²⁾**	10 **(m3 / (h. m²⁾**
Thermal bridging y value	0.15 **(W/m²/K)**	0.15 **(W/m²/K)**
Thermal mass parameter (TMP)	Medium (TMP 250)	Medium (TMP 250) (used in Notional Building)

A key component for Part L1A 2013 is the Fabric Energy Efficiency Standard (FEES) [2], which sets a target figure in kWh/m2 for energy demand in new dwelling.

Fabric Energy Efficiency is assess using DFEE/TFEE figures. For instance, the calculated Dwelling Fabric Energy Efficiency rates (DFEE) overall must be equal or less than Target Fabric Energy Efficiency rates (TEFF) to gauge compliance (DER≤TER). This encourages designers to take a fabric-first approach to reduction carbon emissions prior to installing of LZC teleology.

Table below have shown the overall results of DFEE vs TEFF for all new flats.

Fabric Energy Efficiency kWh/m².annum		**DFEE ≤ TFEE**
TFEE (target)	DFEE (dwelling)	**YES**
57.05	51.90	

Air Tightness

An air permeability of 3 m3/m2/hr has been targeted.

[2] https://energylabsite.wordpress.com/2018/01/12/minimum-energy-efficiency-standards-what-do-they-mean-for-me/

Thermal Bridging

Another key change to Part L 1A 2013 which places increased importance on addressing thermal bridging, that could be minimised by careful detailing, or the use of standard details (such as Accredited Construction Details i.e. ACDs) where appropriate.

The role of thermal bridges in building heat loss can be significant for well insulated buildings, but without detailed drawings of building junctions.

The targeted thermal bridging value used in the SAP calculations was 0.08.

We recommend that as the design is progressed, building junctions are considered carefully to minimise thermal bridging. Standard 'accredited construction details' are available, for which the impact of thermal bridging is known. In many cases the impact of thermal bridging can be ignored if good thermal continuity is achieved through the junction. For more complex or less intuitive scenarios, thermal bridging calculations can be carried out to calculate the additional heat loss.

4.1.2 Active measures

Space Heating

Space heating energy consumption should be minimised by measures including;

- Efficient boilers (91% efficiency)
- Weather compensation control to maximise boiler efficiency
- Individually timed control of heating in each room, enabling heating to be turned off in unoccupied rooms (e.g., bedrooms during the day)
- Insulated pipework and fittings within the plant room to reduce heat loss

Hot Water

Hot water energy consumption can be minimised by measures including;

- Selection of low-flow showers and basin taps
- Design of circulation loops to minimise pipework lengths
- Use of microbore pipework for final legs to fittings
- Insulation of circulation pipework and fittings
- Time control of circulation pump to reduce heat losses
- High levels of cylinder insulation to achieve 1.66 kWh/day heating losses
- Water heating to be timed separately
- Installation of cylinder stat

Ventilation

It is assumed that the new flats will be naturally ventilated.

Lighting

Low energy lighting should be provided throughout the scheme. This will generally be LEDs.

4.2 Material change of use to 3nr flats (flats 3, 4 and 5)

To be in-line with the performance set out in Part L 1B for building fabric u value target, where practically possible, and with the Domestic building services compliance guide for any proposed building services mechanical plants and lighting.

4.3 Carbon Emission Reduction after Be Lean

4.3.1 New-build Flats

Tables below show the resulting carbon emissions for the new flats development before and after applying the "Be Lean" measures outlined above.

As shown, the carbon emissions are predicted to be lower than the base case. This is due to the high performance of building fabric and services.

Regulated CO_2 emissions – New-build Flats (Tones CO_2 per annum)	
TER	3.79
Be Lean (BER)	3.87

	Reduction in Regulated CO_2 emissions	
	Tonnes CO_2 per annum	% of improvement over Baseline
Be Lean	-	-2.0 %

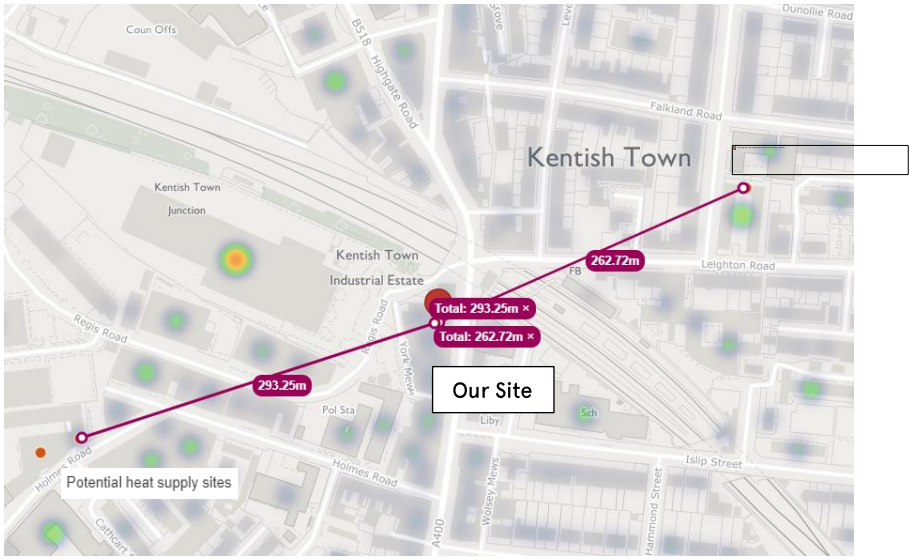
4.3.2 Material change of use to 3nr flats (flats 3, 4 and 5)

FSAP calculation has not been carried out for this part of the development as it is not required by the Building Regulations Part L 1B, instead, compliance for this part of the development shall be met via proposing façade and building services in line with the relevant performances as listed within the Part L1B and the Domestic Building Services Compliance Guide 2013.

5. HEATING INFRASTRUCTURE INCLUDING CHP (BE CLEAN)

5.1 Connection to exiting Heating Distribution Network

Analysis of the London heat map shows that the nearest potential available heat supply sites ar located within approximately 300m radiuses.



Considering the distribution would almost certainly need to avoid going under buildings, the distances would be even greater. Transferring heat over this distance wouldn't be efficient or financially favourable for the relatively small heating demand of these two new flats (flat 1 and 2). For the above reason connection to a district heating network has been ruled out as an option.

5.2 Local Site CHP

Combined Heat and Power only becomes economically viable for larger schemes, and is not suited for small scheme, which has insufficient thermal and electrical loads. Therefore, this has been ruled out for the site. Since there is no viable district heat network in the area, and since CHP is not suited to such a small development, there are no carbon savings achieved by this stage of the energy hierarchy.

5.3 Carbon Emission Reduction after Be Clean

Since a district heating connection, or on-site CHP is unviable, no carbon emissions reductions are available using these measures.

Regulated CO_2 emissions – New-build Flats (Tones CO_2 per annum)	
TER	3.79
Be Lean (BER)	3.87
Be Clean (BER)	3.87

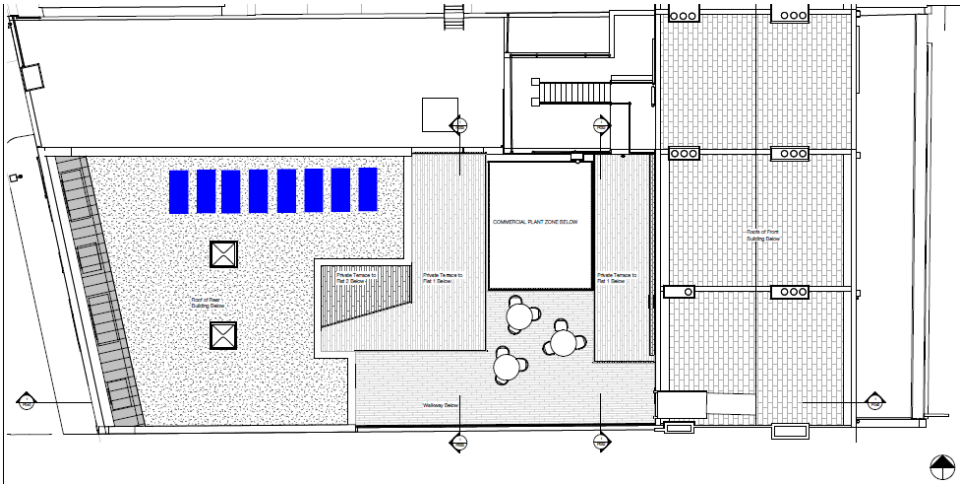
	Reduction in Regulated CO_2 emissions	
	Tonnes CO_2 per annum)	% of improvement over Baseline
Be Clean	-	- %

6. RENEWABLE ENERGY (BE GREEN)

6.1 Technology Options

PV panels are proposed to be installed horizontally on the flat roof of the new flat 2.

8 nr PV panels are proposed to provide approximately 2.6kWp. These can be arranged indicatively as per the below sketch:



6.2 Carbon Emission Reduction after Be Green

6.2.1 New-build Flats

Tables below show the resulting carbon emissions for the new flats development before and after applying the "Be Green" measures outlined above.

As shown, the carbon emissions are predicted to be lower than the base case.

Regulated CO_2 emissions – New-build Flats (Tones CO_2 per annum)	
TER	3.79
Be Lean (BER)	3.87
Be Clean (BRE)	3.87
Be Green (BRE)	3.04

	Reduction in Regulated CO_2 emissions	
	(Tonnes CO_2 per annum)	% of improvement over Baseline
Be Green	0.83 over Lean/Clean	19.80 %

Through the "Be Green" measures, an improvement of 19.84 % can be achieved over the TER.

6.2.2 Material change of use to 3nr flats (flats 3, 4 and 5)

Same as Be Lean and Clean.

7. SUSTAINABLE MATERIALS

The development shall consider the use of sustainable materials through the choice of appropriate buildings materials where both commercially viable and technically possible.

The design team will explore the possibility to minimising the use of resources through the choice of materials to limit the environmental impact of developments where possible.

The design will consider the following measures, where applicable and feasible:

- Managing existing resources;
- Specifying materials using the Building Research Establishment's Green Guide to Specification;
- Ensuring that materials are responsibly sourced;
- Minimising the harmful effects of some materials on human health; and
- Ensuring that specified materials are robust and sensitive to the building type and age

8. WATER CONSUMPTION

The development design shall demonstrate that the development is capable of achieving water efficiency and water recycling.

The design team is committed to achieving a target of maximum internal water use of 110 litres per person/day.

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

The above target can be achieved though specifying all or some of the following water saving fittings:

- A low and water saving dual flush WC
- Aerated showerhead
- Flow regulating access valve for showers
- Water saving flow regulator for basin
- Water efficient lever operated Monobloc tap
- Water efficient Monobloc kitchen tap and water saving tub.

9. CONCLUSION

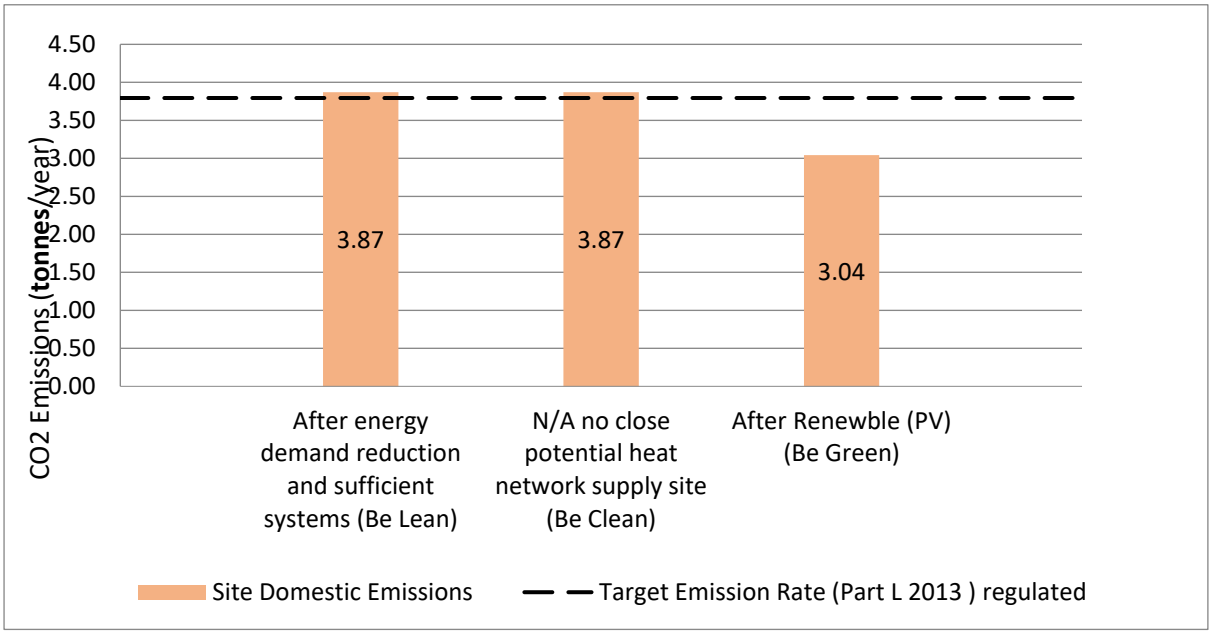
9.1 New-build Flats

The new-build flats (Flats 1 and 2) have the potential to comply with the following:

1. Camden Local Plan CC1 relevant CO2 emissions reduction target (as shown in below table)
2. Part L1A 2013 (as shown in below table)
3. London Plan Energy Hierarchy
4. The relevant items of Camden Planning CPG3

Please see table below, the percentages reduction in CO_2 emissions shown below are for the new flats only and the improvements are shown against the notional building CO_2 emissions as per the Approved Document 2013 Part L1A:

	Regulated Carbon Dioxide Emissions New Domestic	
	(Tonnes CO_2 per annum)	(%)
Part L 2013 Target Emission	3.79	-
Savings from energy demand reduction (Be Lean)	3.87	-2.0%
Savings from Heat network/CHP (Be Clean)	-	-
Savings from renewable energy (Be Green)	3.04	+19.80%
Total Cumulative Savings	**0.70**	**19.80%**



9.2 Material change of use to 3nr flats (flats 3, 4 and 5)

To be in-line with the performance set out in Part L 1B for building fabric u value target **and** with the Domestic building services compliance guide for any proposed building services mechanical plants and lighting.

9.3 Water Consumption and Sustainable Use of Materials

In addition, the design team is committed to achieve a water usage target of 110 litres/person/day and the sustainable use of materials and to incorporating all suitable energy saving measures into the proposed design to reduce the CO_2 emissions in line with the Building regulations following the structure of the London Plan Energy Hierarchy.

Appendices

Appendix 1: Preliminary Appraisal of Renewable Energy Options

This appendix summarises the preliminary analysis of renewable energy options, and identifies which should be assessed in further detail, and which should be discounted because of clear technical reasons or other obstacles.

LZC Technology	Basic Technical Information	Technical, Environmental & Economic implications / Considerations	Suited Application	Site Specific Comment	Detailed Analysis?
Solar thermal	Solar collectors (flat plate or tube) transfer energy into transfer liquid to a closed loop twin coil hot water cylinder	+ Government grants available (RHIs) +/- Can meet a significant proportion of the DHW demand - Efficiency effected by site factors – shading, orientation and roof/ground space -Requires considerable hot water demand all year round to be finically beneficial	Domestic and commercial applications with high annual hot water load; leisure centres, canteens, washrooms	This technology has not been specified as the PV panels proved to be the most viable and sufficient technology to achieve the targeted reduction in CO2 emissions. Hence this has not specified for this development.	No
Wind turbine	Turbine/generator converts wind energy to electrical power.	+ Government grants available (FITs) + Allows on site generation of renewable electricity - Can create structural, vibrations and noise implications - Not suited for urban environments - Costs can be high in relation to the actual amount of electricity generated - Potential for additional planning issues	Large sized turbines in non-urban or offshore locations will be more effective	The site is located in a dense urban area and further planning approvals would be required.	No
Solar Photo-voltaic	Converts sunlight to DC electrical power which then using an inverter to convert to AC.	+ Government grants available (FITs) + Allows on site generation of renewable electricity + Generally payback between 7-12 years + Low maintenance requirements - Efficiency effected by site factors – shading, orientation and roof/ground space	Wide range of building types particularly buildings with limited solar shading and south facing roof	There is sufficient roof space with minor over shading from surroundings. Furthermore, the proposed roof for the PV array has longer longitudinal surface area facing true South.	Yes

LZC Technology	Basic Technical Information	Technical, Environmental & Economic implications / Considerations	Suited Application	Site Specific Comment	Detailed Analysis?
Air source heat pump	Air Source Heat Pumps (ASHP) capture heat from the outside air and transfer the heat directly to the air inside the building or transferring the heat to a liquid medium that can be pumped around the building	+Lower installation cost that ground source heat pump + Can provide heating and cooling + Government grants available (RHIs) -COP is not as good during the heating season when the outside air temperature is often less than the ground temperature -Can restrict distribution strategies -Carbon saving are less clear cut -Noise and visual impact	Wide range of building types particularly building designed to have low temperature heat emitters.	Planning, noise and space limitations.	No
Ground Source Heat Pump	Ground Source Heat Pumps (GSHP) capture heat from the ground and transfer the heat to a liquid medium that can be pumped around the building	+ COP is much better than air source heat pumps + Government grants available (RHIs) -Requires area for ground collector or borehole -High initial capital cost - Can restrict distribution strategies -Carbon saving are less clear cut	Suits building designed to have low temperature heat emitters with sufficient space for necessary ground works	Insufficient external ground space to allow for the installation	No
Biomass	Uses biomass as a fuel source for space heating and hot water	+ Government grants available (RHIs) + Renewable source of heating - Requires large fuel storage capacity - Generally a large capital cost	Building/site with sufficient access and storage facilities and a capable maintenance team	There is insufficient storage space and very limited access for regular deliveries to warrant further investigation.	No

Appendix 2: Key Modelling Inputs

New-build Flats

Parameter	Units	Comments
Accredited Construction Details (ACDs)	-	Not used at this stage
Thermal Bridging y value	W/m^{2}K	0.15
Corridor Heated	-	Yes
Water use target	l/p/day	110
Air Permeability	m^3/hr.m^2	3
New Wall U-value	W/m^{2}K	0.12
New Roof U-value	W/m^{2}K	0.13
New Exposed Floor U-value (If applicable)	W/m^{2}K	0.13
New Window U-value	W/m^{2}K	0.8 (Triple glazing)
New Rooflight U – value	W/m^{2}K	1.2 (Double glazing)
New Glazed Door U-value	W/m^{2}K	0.8 (Triple glazing)
New Solid Door U-value	W/m^{2}K	1.0
Weight of building (Thermal Mass TMP)	-	Medium TMP:250
Boiler	-	Condensing
Ventilation	-	Natural
Seasonal Boiler Efficiency	%	91.0
Design Flow Temperature	-	<=35 (Underfloor heating and radiators)
Hot water storage losses	kWh/l/day	1.66
Tot Water Storage size	Litres	No less than 120 (TBC at detailed design)
Percentage low energy light fittings	%	100

Appendix 3: Supporting SAP Document for New-build Flats

Block Compliance WorkSheet: Flats 1&2 - Lean - Clean - Green

User Details

Assessor Name: **Stroma Number:**
Software Name: Stroma FSAP **Software Version:** Version: 1.0.4.26

Calculation Details

Dwelling	DER	TER	DFEE	TFEE	TFA
Flat 1	13.06	16.67	44.2	51.2	107
Flat 2	15.37	18.78	59.6	62.9	107

Calculation Summary

Total Floor Area	214.00
Average TER	17.73
Average DER	14.22
Average DFEE	51.90
Average TFEE	57.05
Compliance	Pass
% Improvement DER|TER	19.8
% Improvement DFEE|TFEE	9.03

For further information, please contact:

Energylab Consulting Ltd
18 Wenlock Road
N1 7TA

info@energy-lab.co.uk

020 3752 9608