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Energy Statement

12-13 Tottenham Mews

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FES
Clifford Chambers
4 Clifford Street
York
YO1 9RD

www.consultfes.co.uk

Contents

1 Introduction

This report has been prepared by FES on behalf of *Claridge Architects* to accompany the planning application for the works at 11-12 Tottenham Mews, London. This report in particular includes the following;

- A calculation of the baseline carbon emissions of the development.
- An assessment of the potential of the most viable renewable and low carbon technologies

The following documents were considered when formulating the report.

Planning Policy Statement 1 (2007) – PPS 1 strengthens the emphasis on sustainable development, and requires new developments to "secure the highest viable resource and energy efficiency and reduction in emissions."

Planning Policy Statement 22 (2007) – PPS 22 calls for local authorities to actively encourage renewable energy development through local planning policy.

Building Regulations 2010 – Approved Document L1B Conservation of Fuel and Power sets minimum energy efficiency and fabric efficiency standards for existing buildings.

London Plan 2011 – Policy 5.4 of the London Plan encourages developers to take measures to reduce CO_2 emissions from existing buildings through adherence to the Building Regulations and maximising the potential of renewable and low carbon energy sources. There is a presumption that the level of renewable carbon compliance is 20% where "...site conditions make them feasible and where they contribute to the highest overall and most **cost effective** carbon dioxide emissions savings..."

2 Energy Strategy

2.1 The Context

The proposed works fall under the scope of Approved Document L1B 2010. Whilst the Document does not set a minimum emission rate for domestic buildings it does provide minimum fabric efficiency standards. To place the proposed energy strategy into its correct regulatory context it is worthwhile summarising the minimum standards included in the Approved Document.

Table 1 – Minimum Fabric Efficiency Standards

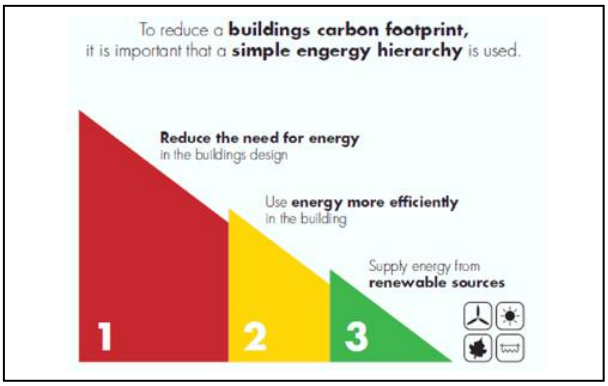
Thermal Element	Part L1B 2010 Minimum Standard
Wall	0.30W/m^{2}K
Roof	0.18W/m^{2}K
Floor	0.22W/m^{2}K
Glazing & Doors	1.60W/m^{2}K

2.2 Proposed Strategy

In line with best practice the proposed energy strategy for 11-12 Tottenham Mews will adhere to the principles of the Energy Hierarchy;

- **Be Lean** – reduce the need for energy.
- **Be Clean** – supply and use energy in the most efficient manner.
- **Be Green** – supply energy from renewable sources.

The Energy Hierarchy



Adhering to the principles of the Energy Hierarchy has a number of benefits. The principle benefits are;

- By reducing the energy requirement of the building the renewable requirement shrinks in proportion. This has obvious cost benefits.
- The sustainable credentials of the building are enhanced and are not validated by simply bolting on expensive renewable equipment. By focusing on fabric performance and the provision of efficient heating systems the building is intrinsically "green".

The **lean** and **clean** measures are those which cumulatively reduce the energy requirement of the development through the provision of efficient building services and the construction of a thermally efficient building envelop. The measures below constitute the lean and clean efforts.

- The existing solid walls will be lined internally with an insulated plasterboard to achieve a u-value of 0.28W/m^2K.
- The basement floor will be upgraded to achieve a u-value of 0.20W/m^2K.
- The glazing will be doubled glazed argon filled units with a u-value of 1.60W/m^2K.
- The proposed roof will achieve a u-value of 0.15W/m^2K.
- If white goods are provided to the eventual occupants, these will be A+ rated or A rated where applicable. If white goods are not installed each occupant should be provided with information on the EU Energy Labelling Scheme to allow occupants to make an informed purchase.
- All communal and external lighting will be dedicated energy efficient with time switches and motion sensors.
- The internal water consumption of a dwelling is now included in the calculation of a buildings energy consumption. As a consequence each flat will achieve an internal water consumption of 125 litres per person per day.
- Each flat will have a gas condensing combination boiler with a minimum SEDBUK 2009 efficiency of 88%. Furthermore the heating system will be zoned and include weather compensators.
- It is worth noting at this stage that opportunities do exist that allow developers to influence the future energy consumption of a building. However the biggest determinant of a dwelling's future energy use is the behaviour of its occupants. This is something which is beyond the scope of legislators or developers. However developers do have the means to educate future occupants as to how best to operate their heating systems

Table 2 – Specification

Element	Minimum Standard	Specification
Existing Wall	-	0.28W/m^2K
Ground Floor	0.22	0.18W/m^2K
Flat Roof	0.18W/m2K	0.16W/m^2K
Glazing	1.60W/m2k	1.60W/m^2K
Heating system & controls	Gas condensing boiler with thermostat & programmer.	Gas condensing boiler with time and temp zone control & weather compensators
Low E lighting	75%	100%

Each proposed dwelling was modelled in SAP 2009 using floor plans provided by *Claridge Architects* and the specification detailed above and on the previous page. The table below summarises the results.

Table 3 – Potential of Proposed Specification

	Carbon Emissions (kg/year)
Base Emissions*	19,190.89
Adoption of Lean Measures	12,042.78
Adoption of Clean Measures	11,389.25

*Those emissions associated with the current building – SAP Appendix S

**The previous edition of the London Plan required the inclusion of non-regulated emissions. However following the 2011 Budget, the amendments to the definition of Zero Carbon and paragraph 5.22 of the London Plan (July 2011) we judge this to be inappropriate in the case of 11-12 Tottenham Mews.

The total emission rate of **11,389.25kg/year** represents the energy efficient baseline of the development. The level of carbon reduction achieved is significant and is equivalent to 40.6% reduction over those associated with the current building.

3 Renewable & Low Carbon Technologies

Before the potential of renewable technologies can be assessed it is important to note the following constraints;

- As an existing dwelling the energy efficient baseline is disproportionally larger than that which could be expected for new build properties – there is limited scope for fabric improvements and SAP must assume default values for thermal bridging and air permeability. The difference between conversion works and new build can be 20%.
- The property is located in a dense urban environment and has a south westerly orientation with a risk of significant over-shading caused by the close proximity of adjacent buildings.

3.1 Solar Thermal Panels

Solar thermal panels use radiant solar energy to heat water for domestic consumption. The system works successfully across the UK as they can work in diffuse weather conditions. In comparison to other technologies it is considered a reliable and proven technology. The system works most efficiently when the panel or evacuated tube is mounted on a 10-60° pitch facing due south, though other combinations do work successfully. During late spring to early autumn months, the system can be expected to meet some 70-90% of a dwellings domestic hot water needs.

Due to the relatively small size of each flat the *Alpha* solar thermal package seems most appropriate for assessment. The *Alpha* package is a 2.2m^2 panel with a 90 litre thermal store and a gas condensing combination boiler. This package has the potential to reduce emissions by **835.06kg/year** of CO_2. This equates to a 7.3% reduction over the energy efficient baseline.

The anticipated cost of such an installation will be roughly £3000-4000 per dwelling with a payback period of some 30+ years. On balance we do not recommend the provision of solar thermal package for the following reasons:

- The orientation and risk of over-shading will reduce the efficiency of the system.
- A payback period does not exist.
- There is insufficient roof space to accommodate 7 solar thermal panels.
- It could proof logistically difficult to install 7 separate thermal arrays.

3.2 Photovoltaic (PV)

Photovoltaic panels convert sunlight into electricity for use within a dwelling. PV panels use cells to convert light into electricity. A PV cell usually consists of 1 or 2 layers of a semi-conducting material such as silicon. The greater the intensity of sunlight, the more electricity is generated. PV systems can come in different forms. The most aesthetically pleasing are PV tiles which resemble roof tiles. However, the most popular are modules which can either sit on the roof or be integrated into it. The technology is most efficient when oriented due south. However, panels orientated south of east or west are suitable. Generally panels orientated away from due south require a greater surface area to generate a set amount of energy.

A review of the roof plan and elevation suggests there is insufficient space to accommodate a significant PV array. Furthermore the close proximity of adjacent buildings and the corresponding risk of over-shading will reduce the efficiency of the system, thus reducing the carbon benefit and extending the payback period.

3.3 Flue Gas Heat Recovery

Flue gas heat recovery (FGHR) is a SAP Appendix Q low carbon technology. The technology utilises the free heat in flue gases to pre-heat mains water, thus reducing the energy requirement of the boiler and producing a carbon benefit. The technology is marketed in the UK by *Alpha, Ideal* and *Baxi*. The carbon benefit of this technology has been examined and found to be **337.61kg/year**.

3.4 Heat Pumps

As an existing building it is not possible to install a ground source heat pump. An examination of the site plan also suggests there is insufficient space to install individual air source heat pumps and thus heat pumps have been rejected as a viable solution.

4 Evaluation

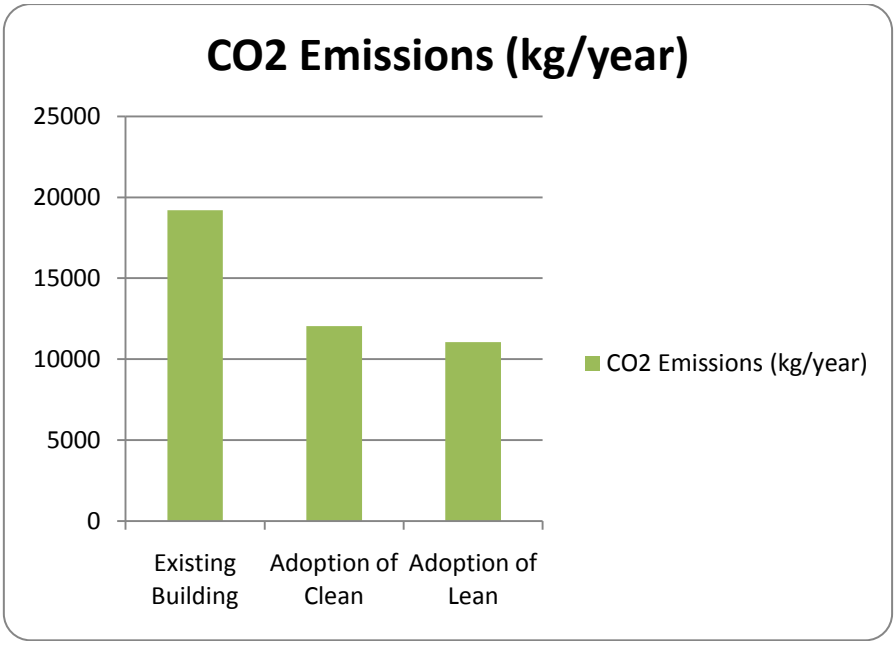
FES was instructed by *Claridge Architects* to review the proposed energy strategy for the works at 11-12 Tottenham Mews and assess the most viable low carbon technology. Following a review we can confirm the following;

- The proposed fabric and services specification satisfies the requirements of Part L1B 2010 and adheres to the principles of the Energy Hierarchy.
- The adoption of lean and clean measures reduces the carbon footprint of the building by **7,801.64kg/year**.
- As an existing building the energy efficient baseline is disproportionally large due to the conventions within SAP 2009.
- A review of the floor plans, elevations, roof plan and the site plan confirms that the property cannot accommodate significant PV or solar thermal arrays. Furthermore the location and orientation of the property would reduce the efficiency and net carbon benefit of such technologies.

Policy 5.4 of the London Plan encourages developers to adopt energy efficiency measures in line with Building Regulations, to reduce the carbon footprint of existing buildings. This requirement will be incorporated into the development and the net carbon benefit has been detailed previously. Policy 5.4 also encourages developers to reduce the carbon footprint of a development through the incorporation of renewable technologies "...site conditions make them feasible and where they contribute to the highest overall and most **cost effective** carbon dioxide emissions savings..." It has been shown previously that it is not feasible or practicable to incorporate renewable technologies into the development and thus we are confident that the current scheme complies with the requirements of the London Plan.

However we recognise that the spirit of the London Plan requires the developer to strife for the highest level of carbon reduction and thus we would encourage the developer to incorporate FGHR into the heating design of each flat. This produces a further carbon reduction of **337.61kg/year**.

The graph below best demonstrates the net carbon benefit of the proposed energy strategy.



We can conclude that the proposed design achieves a high level of sustainability (also evidenced in the accompanying Ecohomes Pre-assessment) and thus we recommend the adoption of the proposed energy strategy by the developer and its approval by the *London Borough of Camden.*

Disclaimer
This report is based on the information provided by the client. Should this prove to be inaccurate the findings and conclusions of this report will be invalidated.