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6 JOHN STREET, LONDON BOROUGH OF CAMDEN

Energy Strategy

G&T John Street Ltd.

October 2014

Quality Management

Issue/revision	Issue 1	Revision 1
Remarks	Final	
Date	27/10/2014	
Prepared by	Justin Kilduff	
Signature		
Checked by	Barny Evans	
Signature		
Authorised by	Barny Evans	
Signature		
Project number	70007778	
Report number	1	
File reference		

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Executive Summary

This Energy Strategy serves to support the detailed planning application for the residential development at 6 John Street, in the London Borough of Camden (hereafter referred to as "the site"). The development includes the refurbishment, and conversion of the Grade II Listed building to accommodate 7 residential units.

The aim of this Energy Strategy is to show how the development is proposed to adhere with local and national policies regarding carbon emissions, energy consumption, and the use of renewable energy.

The relevant policies considered in this Energy Strategy are:

- Approved Document L1B regarding Part L of the Building Regulations 2013;
- London Plan 2011;

As a Grade II listed building, the development has an exemption from the energy efficiency requirements of Part L "where compliance would unacceptably alter the character or appearance of the buildings." However, guidelines are provided on how to include reasonable provision for various types of building work including where for example work on thermal elements is completed.

In light of the policies listed above, this energy strategy has been prepared in accordance with Part L1B. The project targets are as follows:

To improve energy efficiency as far as is reasonably practicable.

The renovation of the Grade 2 listed building will allow for updates of several of the thermal elements of the building. It is expected that the specification as detailed in Appendix R of SAP 2012 (Appendix B) will be achieved for all elements other than the front façade of building. Internal wall insulation and secondary glazing is considered suitable for the front facade as it should not significantly alter appearance or character of building.

Lighting will also be updated within the building to low energy LED lighting.

A study was carried out in order to outline which technologies were considered applicable to the development.

The following technologies were considered in the renewable energy study:

- ✓ Photovoltaic;
- ✓ Solar Thermal;
- ✓ Wind Turbines;
- ✓ Biomass boilers;
- ✓ Ground/Air Source Heat Pumps; and
- ✓ Gas Combined Heat and Power (CHP).

Wind turbines have been ruled out at the site given the low wind resource and proximity to dwellings as the development lies within an urban area.

Gas-fired Combined Heat and Power has been ruled out at site given the low number of dwellings to be included at the site and air quality issues. Biomass boilers have also been ruled out as the site lies within an Air Quality management Area and would require fuel delivery and storage within the premises.

Ground source heat pumps are not recommended given the limited level of available land at the site and fact that the land is already occupied. Roof mounted photovoltaic and solar thermal panels have been ruled out given the sites location within the Bloomsbury Conservation Area.

The recommended approach is to deploy a communal air source heat pump system with a condenser unit within each of the dwellings. This approach would allow the dwellings to be heated and cooled using an efficient unit, with zero emissions at point of use and would negate the requirement to include gas boilers within each dwelling.

1 Introduction

1.1 General

1.1.1 WSP was commissioned by G&T John Street Ltd. to develop an Energy Strategy that would consider relevant local and national policies governing sustainable construction, and provide recommendations for the development in regard to satisfying these policies.

1.1.2 The development proposed comprises the redevelopment and conversion of an existing building from an office use to residential. No section of the proposed development is considered new build.

1.1.3 Collectively the scheme proposed for the site will be referred to as the Proposed Development.

1.2 Site Review

1.2.1 The site is located on John Street in the London Borough of Camden.

Picture 1 Site Location

2 Current Policy Context

The national and local policies relevant to the Proposed Development are detailed below:

Policy		
UK Government	**Local Policy**	**Project Target**
Climate Change Act 2008 The Government's renewable energy strategy aims to cut its carbon dioxide emissions by 29% against 1990 baseline levels by 2017. **PartL AD L1B (existing dwellings)** – Listed buildings have an exemption from the energy efficiency requirements where compliance would unacceptably alter the character or appearance of the building. The refurbishment of the building would be classed as a material change of use and the guidance gives limits to the performance of thermal elements and heating systems where these are to be changed.	**London Plan 2011 and updates** Policies relevant to energy consumption and CO_2 emissions include: Policy 5.2 Minimising Carbon Dioxide Emissions Policy 5.3 Sustainable Design and Construction Policy 5.4 Retrofitting Policy 5.5 Decentralised Energy Networks Policy 5.6 Decentralised Energy in Development Proposals Policy 5.7 Renewable Energy Policy 5.9 Overheating and Cooling	No specific quantitative targets apply to this development as the scheme is a refurbishment of a Grade 2 listed building. Implement energy efficiency measures where possible that do not alter the character of the building.

Table 1 Current policy

3 Site Energy Demand

3.1.1 Site energy demand was not estimated as the proposed development involves the refurbishment of an existing building. As discussed in policy review there are no quantitative targets for the development.

4 Demand reduction (Be Lean)

4.1.1 The existing buildings refurbishment falls under PartL AD L1B of the Building Regulations with regards to the energy consumption and carbon emissions. As a listed building, there are no specific values with regard to performance. However, guidelines are provided on how to include reasonable provision for various types of building work including where for example work on thermal elements or controlled elements is completed

4.1.2 It is proposed that all elements other than the front façade will meet the values found in Appendix B which consist of the recommended specification to achieving compliance with Part L of Building Regulations 2013.

4.1.3 Internal insulation will be included on the interior of front facade as external insulation or the complete removal of existing brickwork is not feasible as it is a Grade 2 listed façade. The windows of the front façade will be updated with secondary glazing. English Heritage guidance states that “carefully designed and installed secondary glazing allows the original windows to be retained unaltered, and where necessary repaired, whilst reducing air leakage and conducted heat losses.”

4.1.4 The result of this will be to substantially reduce the energy demand of the proposed development.

5 Be Clean

Following the application of efficiency measures, the next step is to consider which technologies can provide further improvement in CO_2 emissions. Following the London Plan, the recommended hierarchy is:

- Prioritise connection to existing heat networks;
- allow for connection to planned networks; and
- Include a site wide heat network.

5.1 Existing and Planned Heat Networks

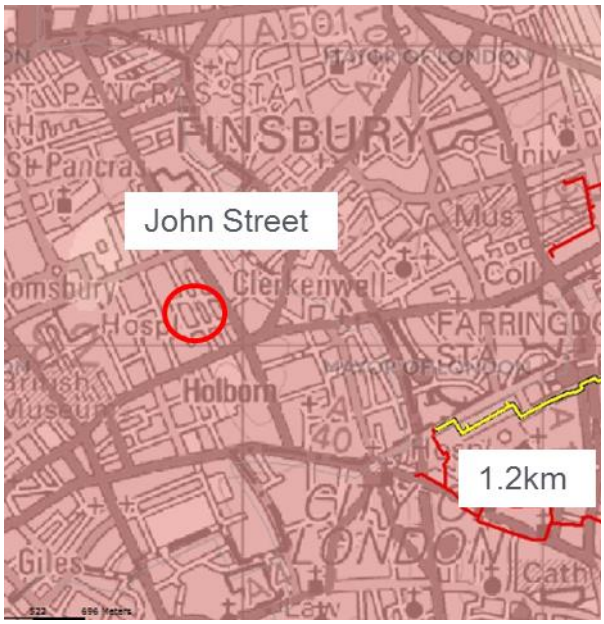

Figure 1: Existing Heat Networks and Site Location (London Heat Map)

5.1.1 As shown by Figure 2, the Smithfield district network is over 1.2km from the site.

5.1.2 Connection to a heat network would involve the installation of underground insulated flow and return pipes - at these distances and low number of units to be developed connection to any of the existing schemes is not economically viable.

5.1.3 There are also no planned heat networks within close proximity of the site.

5.2 Site Wide Heat Network

5.2.1 A minimum of 300 dwellings (or equivalent) with a density of greater than 60 dwellings per hectare is generally the threshold before which a CHP district heat network is considered. This is due to the relatively small energy demand from residential developments and additional administrative burden of developing such schemes at a scale where energy service companies (ESCOs) are generally not active.

5.2.2 The proposed development does meet the minimum threshold in terms of dwelling density as the site includes 7 dwellings. It also does not have a diverse thermal demand and the high standards of fabric performance will result in a low thermal demand density.

6 Be Green

6.1.1 In line with Policy 5.7 of the London Plan, renewable energy technologies have been assessed with a view to determining their applicability in optimising generation potential at the Site.

6.1.2 Table 4 below indicates the renewable energy resources that are available and the technology that can provide either heat or electricity or both.

	Resources	Electricity	Thermal
Zero Carbon	Solar	Photovoltaic panels	Solar thermal collectors
	Wind	Wind turbines	-
	Biomass	CHP	Biomass boilers / CHP
Low Carbon	Ground	-	Ground source heat pumps
	Air	-	Air source heat pumps

Table 4 Low and zero carbon resources

6.1.3 As they are not recommended for the site, Solar Photovoltaics, Solar Thermal, Biomass Heating, Wind Turbine and Ground Source Heat pump analysis is shown in Appendix D.

6.2 Air source resource

6.2.1 Air Source Heat Pumps (ASHPs) take a low grade heat resource (air) and increase the temperature through a vapour compression cycle. Heat pumps can deliver this heat source typically at a co-efficient of performance of 2 to 4.5, meaning that for each kilo-Watt hour of electricity consumed by heat pump 2 - 4.5 kWh of useable heat is delivered. To use the air temperature as the heat source, single or communal units are installed outside of a building. Following compression heat is transferred to heat distribution system. This technology suits steady low temperature applications and is therefore suited to underfloor heating and well insulated buildings. A key advantage is that the cycle can be reversed to provide cooling negating the requirement for additional cooling equipment.

Criteria for ASHP

- ✓ Requirement for heating and cooling;
- ✓ Ability to use low temperature heat distribution for space heating

Commentary & viability Air Source Heat Pumps

6.2.2 This technology can provide the vast majority of heating and hot water demands. This will allow for significant CO_2 emission savings at the site over the long term as the fuel source, electricity will drop in carbon intensity as the grid decarbonises and some CO_2 emission savings now.

7 Conclusion

7.1 Energy Strategy

7.1.1 The front façade of building is to be upgraded within the constraints of any work completed in a listed building. It is proposed that internal insulation will be installed and that windows will be refurbished with new secondary glazing to improve thermal performance. All remaining element are expected to meet the recommended specification for achieving compliance with Part L of Building regulations 2013.

7.1.2 Currently there are no existing or planned heat networks in close proximity to the development. The proposed development is also below the threshold of 300 units recommended for an on-site CHP unit.

7.1.3 An assessment was carried out in order to outline which technologies could be included in design. Air source heat pumps are recommended at the site given the availability of roof area in which a communal unit can be located. Heating will be provided by a communal air source heat pump with condensing units in each dwelling.

Appendix A

Schedule of Accommodation

Flat Areas

			GIA		Amenity	
Level	Flat No.	No. Beds / Person	sqm	sqft	sqm	sqft
LGF / GF	FLAT 1	2/3	89.9	966.4	38	408.5
LGF / GF	FLAT 2	2 / 4	122.3	1314.7	30.6	329.0
1	FLAT 3	2/4	116.4	1251.3	24.5	263.4
2	FLAT 4	1 / 2	52.4	563.3	7.2	77.4
2	FLAT 5	1 / 2	50	537.5	6.8	73.1
3 / 4	FLAT 6	2 / 4	106.5	1144.9	7.9	84.9
3 / 4	FLAT 7	2 / 4	104.1	1119.1	7.3	78.5
Total			641.6	6897.2	122.3	1314.7

Appendix B

These are the values proposed to be achieved for the development once the conversion is completed aside from front fabric of front façade.

Fabric Performance

Building Element.	(Notional)
External Walls (W/m^2K)	0.18 (targeted for refurbished elements)
Floors (W/m^2K)	0.13 (targeted for refurbished elements)
Roof (W/m^2K) (Top Floor Unit Only)	0.13 (targeted for refurbished elements)
Window (W/m^2K)	1.4 (targeted for refurbished elements)
Thermal Bridging (W/K)	0.05
Controls	Charging system linked to use, programmer and TRVs
Air Permeability (m^3m^2h)	5
Ventilation	Natural

Appendix D

The following technologies were not considered feasible at the site;

Solar Photovoltaics:

Though technically feasible given available roof area and solar resource, planning constraints serve to discourage the development of this technology. The proposed development lies within the Bloomsbury Conservation Area and consists of a Grade 2 listed building.

Solar Thermal:

Though technically feasible given the availability of roof area and thermal demand planning constraints serve to discourage the development of this technology at site. The proposed development lies within the Bloomsbury Conservation Area and consists of a Grade 2 listed building.

Biomass Heating:

Biomass Boilers are available that could serve the site from a communal heating system. However, the use would be discouraged as it lies within an Air Quality Management Area (AQMA) and because of the additional requirements for fuel delivery vehicles and storage.

Wind Turbines:

Building integrated wind turbines are generally not recommended due to lower wind speeds in urban areas. The noise and visual impacts of turbines of this scale mean that they would need to be sited a significant distance from residential properties which is not possible on a site of this size.

Ground Source Heat Pumps:

There is no free undeveloped land available of the area required to support a ground source heat system piles or coils.

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