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Land Adjacent to 43 Carol Street
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Sustainability Statement

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1. OVERVIEW

The land adjacent to 43 Carol Street involves the construction of a new mixed use development. The new proposed development consists of a basement and 3 floors with a gross floor area of 422m^2.

It is understood that the development shall consist of studio spaces with a basement workshop and a 2 bed residential flat.

1.1. APPROACH

The new proposed development is committed to minimising the environmental impact of the project through the efficient design, procurement and handover of the project by:

- Preventing any noise pollution issues to neighbouring buildings;
- Preventing light pollution issues to neighbouring buildings;
- Designing the project to prevent an increase in surface water run-off from the buildings;
- Utilising recycled building materials, wherever possible;
- Specifying recyclable materials, wherever possible;
- Employing construction management techniques to minimise the environmental impact of the building;
- Ensure all contractors are trained to recognise opportunities to minimise waste or recycle;
- Installing solar control glass to minimise solar heat gains in summer;
- Minimising the space heating demand through the use of high performance fabric and control fittings;
- Constructing the envelope/lining of the extension to achieve an airtightness of 5m^3/m^2 at 50 Pa;
- Implementing a natural ventilation strategy to serve the dwelling and studio spaces with dedicated extract fans in bathrooms, WC's and kitchen areas;
- Implementing a mechanical ventilation strategy to serve the basement workshop, utilising a high efficiency energy recovery system;
- The provision of new high efficiency ground source heat pump technology and controls to serve the proposed development heating demand. The weather compensated heat pump installation will supply low temperature hot water to an underfloor heating system, integrated into the floor construction;
- The installation of low energy lighting;
- The installation of absence and photocell lighting controls within bathrooms, communal and circulation spaces;
- The installation of water efficient sanitary fittings to reduce water consumption;
- The installation of energy sub-metering to facilitate energy metering, monitoring and targeting strategy;
- The installation of water sub-metering to facilitate the monitoring and management of water consumption;
- The provision of high efficiency lighting and controls to all new areas.

2. LEGISLATIVE AND VOLUNTARY OBLIGATIONS

The project shall adhere to and in some cases exceed all building regulation obligations that seek to improve the environmental performance of the project. The new dwelling shall seek to achieve:

- The Camden Planning carbon emission target of a minimum of 20% reduction in the SAP ratings on Part L1A;
- The Camden Planning water consumption target by achieving a maximum of 110 litres/person/day;
- Voluntary reduction of carbon emission by achieving a minimum of 10% reduction in the SBEM ratings on Part L2A.

3. DESIGNING FOR SUSTAINABILITY

3.1. INTRODUCTION

The design team has proposed to reduce the environmental impact of the project through the development of the design from intent to completion.

3.2. DESIGNING TO REDUCE ENVIRONMENTAL IMPACT

The project has sought to reduce its environmental impact through the specification and detailing of materials and workmanship. It shall realise this goal, wherever possible, by:

Specifying materials from sustainable sources (such as timber, etc.).

Specifying recycled / re-used materials.

Specifying materials, wherever possible, that are suitable for re-use, such as:

- Steelwork;
- Mechanical fixings;
- Mechanical joints.

Specifying materials technologies that are suitable for recycling, i.e.:

- Timber;
- Copper / steel pipework (with mechanical joints);
- Cabling;
- Plasterboard;
- Metal studwork;
- Aluminium;
- Glass screens.

Materials will be sourced locally to reduce travel distances of materials to the construction site and therefore helping with minimising the carbon footprint for the construction project.

3.3. DESIGNING TO MINIMISE ENERGY AND WATER CONSUMPTION

The general approach of the project is to employ Lean, Mean or Green environmental strategies to minimise the energy and water consumption of the new building.

Lean is defined as reducing the building's water and energy consumption by improving the passive performance of the building elements/construction.

It has been proposed to:

- Optimise the thermal performance of the external envelope;
- Optimise the air tightness of the proposed construction;
- Optimise natural ventilation strategy;
- Optimise the opportunities for daylighting;
- Implementing other sustainable urban drainage (SUDs) measures;
- Installing water efficient sanitary fittings.

Mean is defined as meeting building demands efficiently by utilising efficient technologies and energy management practices to improve the performance of the following systems installations:

- Ventilation;
- Heating;
- Lighting;
- Hot water;
- Small power;
- Sub metering and energy management.

Green is defined as the utilisation of renewable/low carbon energy sources to provide the low carbon generation of:

- Heat;
- Hot Water.

It is proposed to introduce a high efficiency, closed loop, ground source heat pump system to reduce the consumption of energy.

3.4. TRAINING OF CONTRACTORS

The project shall seek to reduce its environmental impact through the site induction process required for all Contractors. The induction process shall be required to include a section on environmental issues, which covers subjects such as:

- The importance of avoiding waste to the environment;
- The importance of recycling;
- The importance of integration between trades;
- The avoidance of materials / substances that are hazardous to health or the environment;
- Details of the site waste management plan;
- The importance of the quality of Operation and Maintenance information for the energy efficient handover and operation of the project.

3.5. CONSTRUCTION MANAGEMENT

The project shall seek to reduce its environmental impact through the management of the environmental risks involved with the design and construction process. It seeks to achieve these goals, wherever possible, through:

- The design, specification and procurement of materials / equipment to reduce their environmental impact;
- The pre-fabrication of building elements;
- The avoidance of the use of deleterious or hazardous materials;
- The avoidance of the use of paints, solvents, adhesives, etc. that are harmful to the environment;
- The avoidance of the use of ozone depleting refrigerants;
- The development and maintenance of emergency procedures for effectively dealing with significant hazards where they exist and to limit their risk to health and the environment;
- The procurement of materials to reduce packaging;
- The planning of site deliveries to reduce the carbon emissions of transportation;
- The planning of construction works to minimise the number of trades required;
- The adoption of trades whose materials / products facilitate re-use / recycling in the future;

- The requirement for all Contractor’s to demonstrate a commitment to environmental management;
- The use of highly skilled specialist sub-contractors from the Main Contractor's supply chain to minimise wastage;
- The co-ordination and integration of trades, to minimise project wastage;
- The organisation of the site and site compound to facilitate recycling and reduce the frequency of collections necessary (and hence their carbon impact);
- The implementation and communication of a site waste management plan;
- The production of a comprehensive operation and maintenance manual, to facilitate the efficient handover and operation of equipment / facilities;
- The creation of a soft landing process, to facilitate the efficient handover and operation of all equipment and facilities.

3.6. WASTE MANAGEMENT PLAN

The project shall seek to reduce its environmental impact through the implementation of a site waste management plan.

A site waste management plan seeks to:

- Promote the economic usage of construction materials;
- Encourage construction techniques that minimise wastage (to minimise disposal to landfill);
- Ensure that all waste is processed to ensure re-use and recycling, wherever possible;
- Ensure all non re-usable / non-recyclable waste is disposed of responsibly;
- Ensure all hazardous waste is disposed of responsibly;
- Monitor and report on the processing of waste.

4. WATER EFFICIENCY

As per Approved Document Part G, the potential consumption of water by persons occupying a new dwelling must not exceed 125 litres per person per day.

However, water consumption for the new proposed development shall achieve Camden's Planning target of 110 litres person per day. The water flow rates that shall be adopted within the development are shown in the table below:

Installation	Flow rates
Shower – low flow	8 (litre/min)
Shower – high flow	12 (litre/min)
Sink	8 (litre/min)
WHB	4 (litre/min)
WC – Dual Flush	4 litre/3 litre flush
Bath	140 litres
Dishwasher	1.0 litres/place setting
Washing Machine	7.5 litres/kg dry load

The maximum calculated consumption of potable water has been estimated as 107 litres/person/day including the 5 litres/person/day for external use. This is a 15% reduction against the maximum consumption required by Part G of the building regulations.

The calculations can be found in appendix A.

5. PROPOSED LOW CARBON STRATEGY

This section outlines how a low carbon strategy is targeted and discusses the constraints regarding implementation of technologies.

5.1. CONSTRAINTS ON THE ADOPTION OF LZC TECHNOLOGIES

The proposed project seeks to adopt low carbon technologies within the new proposed site to create residential and studio spaces.

As a consequence, the adoption of some low carbon and renewable strategies are constrained by the limitations imposed by the overall development and the site, for example:

1. The development is adjacent to residential accommodation and B1 commercial spaces, and the design team feel the adoption of biomass boilers would impact on neighbours, as:

    - The biomass boiler would require large deliveries of biomass pellets which would impact on local traffic;
    - The biomass boiler would require a high flue to discharge above the roof level of the neighbouring residential apartments/buildings.

2. The proposed development is located in a residential and commercial area, and the design team feel that the adoption of a wind turbine would impact upon neighbours, as:

    - The wind turbine would require to be a minimum of 18m high on open ground;
    - Wind turbines can give rise to stroboscopic light effect on neighbouring buildings;
    - The noise from a wind turbine can cause nuisance to neighbouring residential units;
    - The site is very constrained and there are no viable locations within the curtilage of this site.

3. The development is located in a residential and commercial area, and the design team feel that the adoption of a combined heat and power strategy (CHP) would impact the site, as:

    - The CHP boiler would require a high flue discharge to comply with the Clean Air Acts. This would have to discharge above the high point of the residential units.
    - The development does not have an adequate year round base heat requirement.

5.2. LZC TECHNOLOGY COMPARISON TABLE

Technology	Biomass	Wind Turbine	Solar Hot Water	Ground /Air Source Heat Pumps	PV Array	CHP - Gas
Planning Issues/Criteria	There is limited space for a biomass boiler fuel store and associated exhaust flues on the immediate site.	Planning permission would be required. There are concerns regarding visual impact and noise for nearby residential accommodation.	Planning permission would be required as the proposed array is over 4kW.	GSHP: Planning unlikely to be required ASHP: Planning required and would be subject to an external noise survey, if units were located on immediate site.	Planning permission would be required for PV associated with residential development.	There is limited space for a combined heat and power plant (CHP), associated accumulators and boilers on site.
Noise Issues	May be noise issues associated with delivery/loading of fuel but probably not with boiler itself.	The BWEA Reference Sound levels at 25m and 60m at an 8m/s hub height wind speed are: Lp,25m = 52.5dB(A); Lp,60m = 45dB(A). The proposed buildings are for residential use and there are neighbouring residential properties well within a 25m radius, giving rise to noise concerns.	There is no noise from this technology when operating	GSHP: Noise levels generally low. ASHP: Acoustic treatment available to mitigate the noise impacts of external equipment.	There is no noise from this technology when operating	CHP engine will generate some noise but can be mitigated by acoustic treatment of the plant room
Land Use Issues	There is limited space on the immediate site to house a biomass boiler, fuel store, accumulator and associated flues.	The adjacent St. Martins Garden is for public use	Roofs of buildings suitable to accommodate solar collectors. Potential issues regarding the aesthetics and over shading.	GSHP: Formation of boreholes on site feasible. ASHP: External plant space available.	Roofs of buildings suitable to accommodate PV arrays. Potential issues regarding the aesthetics and over shading.	There is limited space on the immediate site to house a combined heat and power unit, accumulator and associated flues.
Base load available	If optimally sized base loads acceptable except for (holidays). Supplementary technology required to meet peak loads.	Limited base load available but it is feasible to feed into grid.	Limited hot water base load available. Supplementary technology required to meet hot water storage requirement.	Heating base load available	Limited base load is available but it is feasible to feed into grid.	If optimally sized base loads acceptable except for (holidays). Supplementary technology required to meet peak loads.
Feasibility of exporting heat/electricity from the system	Exporting heat to some neighbouring properties is feasible. However capital cost of creating district heating network high.	Excess electricity could be exported to the grid during periods of low demand such e.g. during holidays	Unlikely to produce sufficient output/excess heat for export. Low grade heat from solar collector suitable for storage but not export.	Not economically feasible for GSHP or ASHP	Excess electricity could be exported to the grid during periods of low demand such e.g. during holidays.	Export of excess electricity to grid feasible. There is no year round base load for heat.

Technology	Biomass	Wind Turbine	Solar Hot Water	Ground /Air Source Heat Pumps	PV Array	CHP - Gas
Availability of grants/financial incentives (N.B. potential subject to change)	Renewable heat incentive (RHI)	Feed in Tariff (FIT)	Renewable heat incentive (RHI)	GSHP: Renewable heat incentive (RHI) ASHP: RHI not currently available	Feed in Tariff (FIT)	Up to 2kW RHI/FITS
Life cycle CO_2 payback period 1	Not applicable as technology not suited to project.	Not applicable as technology not suited to project.	Not applicable as technology not suited to project.	Approximately 6 years	Not applicable as technology not suited to project.	Not applicable as technology not suited to project.
Adopted	No	No	No	Yes, GSHP or ASHP (Subject to noise survey)	No	No

[1] Defined as the period when the CO_2 saving from the technology is equal to the emissions associated with the production, installation, maintenance and decommissioning of the technology (From Generating the Future: An analysis of policy interventions to achieve widespread micro-generation penetration, Energy saving trust, Nov 2007, P18).

5.3. EMISSION SUMMARY

From the comparison table above and extensive SBEM and SAP modelling, ground source heat pump was identified as the preferred strategy.

The table below outlines the CO_2 emissions and fabric energy efficiency summary for the residential accommodation, as per the SAP assessment.

	CO_2 Emission Rate		Fabric Energy Efficiency Rate	
	Actual (DER)	Target (TER)	Actual (DFEE)	Target (TFEE)
Residential Accommodation	22.99	32.13	72.3	72.7

The current SAP calculations outline an emission reduction of 43% of the proposed residential demise, over the target emission rate (TER).

The table below outlines the energy and CO_2 emissions summary for the studio areas, as per the SBEM assessment.

		Notional	Actual	Reduction
Area	m^2	393	393	
Heating + Cooling	MJ/m^2	95.61	69.68	27%
Primary Energy	kWh/m^2	80.34	68.32	15%
Total Emissions	kg/m^2	13.6	11.5	15%

The current SBEM calculations outline an emissions reduction of 15% of the proposed studio spaces, over the notional SBEM model.

APPENDIX A – WATER EFFICIENCY

Water consumption calculation

Installation	Unit of Measure	Capacity/Flow Rate	Use Factor	Fixed Use Litres/Person/Day	Litres/Person/Day
WC Dual Flush	Full flush volume (litre)	4.00	1.46	0.00	5.84
	Part flush volume (litre)	3.00	2.96	0.00	8.88
WHB	Flow rate (litre/min)	4.00	1.58	1.58	7.90
Bath	Capacity to overflow (litre)	140.00	0.11	0.00	15.40
Shower	Flow rate (litre/min)	9.30	4.37	0.00	40.64
Kitchen sink	Flow rate (litre/min)	8.00	0.44	10.36	13.88
Washing Machine	Litres/kg dry load	7.50	2.10	0.00	15.75
Dishwasher	Litres/place setting	1.00	3.60	0.00	3.60
				Total	111.89
				Greywater (l/person/day)	0.00
				Rainwater (l/person/day)	0.00
				Normalisation Factor	0.91
				Total Water Consumption	101.82
				External Water Use	5.00
				Total Water Consumption (litre/person/day)	106.82

Water consumption for multiple shower fittings

Shower Fitting Type	Flow Rate (litres/min)	Quantity	Total per Fittying Type
1. Shower - low flow	8	2	16
2. Shower - High flow	12	1	12
	Sum of Quantity	3	
		Total (sum of all, Totals per Fitting Type)	28
		Average flow rate (litres/min)	9.3
		Highest flow rate	12
		Proportionate Flow Rate	8.4