



ENVIRONMENTAL STANDARDS STATEMENT

FOR

Construction of a New Dwelling - South View House,

Nut Bank Lane, Middleton, Manchester,

M9 6BH



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1.0 INTRODUCTION

Strzala Architects have produced this Environmental Standards Statement to outline the sustainability rating and the provision of renewable energy within the Nut Bank Lane development. The statement will highlight, consider and identify renewable and decentralised energy technologies which will reduce the overall carbon emissions of the development.

The development is solely for residential use and will be constructed in line with the Part L Building Regulations guidance. Proposed M&E and HVAC systems have been considered in conjunction with the design to ensure that a suitable, future-proof design has been presented.

Given that the project is residential, located adjacent to a private road owned by the developer. No harmful impacts will be anticipated with regard to traffic and micro-local amenities. All rooms within the building have been suitably designed to ensure there is sufficient space for heating and lighting provisions.

2.0 ENERGY EFFICIENT MEASURES

Throughout the design process, energy efficient measures have been incorporated into the dwelling to ensure that energy consumption is reduced further. Please see below how these measures have and will be incorporated into the new dwelling.

2.1 Design / Materials

The design of the new dwelling has been considered carefully from concept to detailed design, ensuring that the energy performance of the building can be positively affected from key design decisions.

Once particular aspect considered during the design process was how embodied energies of the project could be reduced – In particular, it has been proposed that the external brick/stone work is to be reclaimed red bricks / stone from local sources, thus reducing the energy required to produce and transport the materials from site.

An Electric Vehicle Charging Point will be located within the Double Garage facility, ready for use once the dwelling is occupied. New legislation states that a Vehicle Charging point be supplied on every new house built in the UK, with the "Road to Zero" strategy enabling Electric Vehicle charging points that are suitable for planning requirement 106. The Charging Point will be located centrally against the back wall of the garage, which will provide easy access to any car parked within the garage. Please review the EV Charging Document which indicates the general / spatial arrangement of the garage and highlights the charging point location.

The superstructure of the project will be primarily timber frame – One of the main reasons this form of construction was selected was to ensure that a more environmentally friendly structural solution was achieved. All the timber raw materials will be sourced from managed sources which are members of the 'Forest Forever Campaign' and certified by the Forest Stewardship Council (FSC) which provides a market driven mechanism to improve forest management worldwide.

2.2 Thermal Elements

The proposed new building's fabric elements shall be in compliance with the Approved Building Regulations Part L1A 2010.

Element Design U-Values	(W/m ² K)
External Walls	0.13
Roof	0.13
Floor	0.11
Windows	1.30
Doors	1.00

Table 1: Design U-Values A design air permeability rate has been set at 4m³/m²/hr at 50Pa.

2.3 Domestic Heating & Hot Water Services

The hot water and heating generation shall be supplied by the proposed ground source heat pump – Heat exchangers will transfer the additional heat energy to the water piped through the dwellings distribution system. This water will be used for spatial heating such as radiators and underfloor heating. The domestic water will be stored within a hot water cylinder providing distribution for other hot water household needs.

2.4 Lighting

The provision of natural daylight throughout the house is of upmost importance to the scheme and has been considered through the design process to ensure that all rooms have access to natural light, thus minimising the use of artificial lighting where possible.

High specification glazing has been specified to ensure that day lighting levels are maximised, heat loss is minimised and any noise pollution is mitigated from the nearby M60 motorway. Where artificial lighting is used, high efficiency LED lamps will be installed alongside other facilities including automatic sensors and dimming systems to adjust as natural lighting levels fluctuate. External security lighting is to be solar powered and to be motion sensor responsive where feasible.

3.0 ON-SITE RENEWABLE ENERGY ASSESSMENT & SELECTION

A number of technologies were assessed during the design process to ensure that a suitable low carbon system was selected for the development which would be efficient in the terms of financial constraints, site topography and technical installation.

3.1 Air Source Heat Pumps

An air source heat pump (ASHP) works by transferring heat absorbed from the outside air to an indoor space. This works via the wet central heating systems to heat radiators and provides domestic hot water. Heat pumps work similarly to a refrigerator: they absorb heat and transfer it to another medium.

Although Air source heat pumps are relatively quick and easy to install compared to ground source systems. They can be relatively noisy, not as aesthetically pleasing and in the case of this development; a larger than average unit would be required to heat the entire house.

From reviewing the above, it was decided that this option would not use the site to its strengths as the site offers a greater potential to reap the benefits of a ground source heat pump system, given its size and area.

3.2 Ground Source Heat Pumps

A Ground Source Heat Pump transfers heat from the ground into buildings. The Radiation from the sun heats the earth and then the heat is stored around 2m below ground level at around 10°C, even throughout the winter.

A ground source heat pump uses a ground heat exchange loop to tap into this constantly replenished heat store to heat buildings and provide hot water. For every unit of electricity used by the heat pump, three to four units of heat are captured and transferred. In effect this means a well installed Ground Source Heat Pump can be 300-400% efficient in terms of its use of electricity. At this efficiency level there will be 70% lower carbon dioxide emissions than for a gas boiler heating system. If the electricity is provided by renewable energy, then carbon emissions can be reduced to zero.

As the site area is sufficient enough to store this system, this will be provided as part of the proposal for the new dwelling. The ground source heat pump will provide heating/cooling and hot water to the development.

3.3 Biomass Boilers

Biomass boilers work by burning biological matter and outputting the resulting heat for use in heating systems. Wood pellets, chips, logs or other biological materials are fed – automatically, semi-automatically, or by hand – into a combustion chamber where they are ignited. The hot gas and air produced by this process travel through a flue, and are then passed through a heat exchanger, which transfers the heat to the water used in the property's central heating system. The excess heat is also stored in a thermal tank (also called a buffer vessel).

The process is classed as carbon-neutral given that the carbon that was absorbed during growth is equal to the output, however this doesn't factor in the treatment and transport of the fuel itself. The average system would require up to 5+ Tonnes/year of fuel and would thus require an additional storage space – therefore, it was considered that this option would be unviable and resources could be better invested elsewhere.

3.4 Photovoltaics

Photovoltaic panels (PV) can provide a relatively low maintenance solution to reduce the carbon footprint of a residential property between 1.3 & 1.6 Tonnes per year. The power is generated throughout most daylight conditions, although they are most efficient when exposed to direct sunlight or are orientated to face plus or minus 30 degrees of due south. PV panels typically have an electrical warranty of 20 – 25 years and are eligible for the Government's Feed in Tariff (FITS) incentive scheme for the 25 years after the installation.

When factoring in the location of the site and the amount of direct sunlight that could be harvested, it was determined that ground source heat pumps would be a better economical and cost-effective solution to reduce energy emissions.

3.5 Wind turbines

Wind power can be used to generate electricity either in parallel with mains supplies or as standalone solutions using battery back-up. In order to generate worthwhile quantities of electricity, average wind speeds of between 5-6m/s are necessary (the UK government is currently advising 5.5-6.0m/s as the threshold). However, given the location of the development, wind speed databases suggest that this option would be least effective and impracticable in provided a sufficient renewable energy output.

3.6 Combined Heat and Power (CHP)

Combined heat and power (CHP) are a highly efficient process that captures and utilises the heat that is a by-product of the electricity generation process. By generating heat and power simultaneously, CHP can reduce carbon emissions by up to 30% compared to the separate means of conventional generation via a boiler and power station.

The heat generated during this process is supplied to an appropriately matched heat demand that would otherwise be met by a conventional boiler. CHP systems are highly efficient, making use of the heat which would otherwise be wasted when generating electrical or mechanical power. This allows heat requirements to be met that would otherwise require additional fuel to be burnt.

For CHP systems to be most efficient, it is essential that heating demands are continuous and that heating and electricity demands remain fairly consistent. As this isn't the possible in the means of the new dwelling building, a CHP system would not be beneficial to the scheme and better alternatives are available.

4.0 CONCLUSION

This Environmental Standards Statement and the associated approved plans highlight and present the benefits of which energy efficient energy systems are most suited to the proposed development site.

These proposals have been developed to try a previously unused site into useful new development. The design and spatial arrangement of the development floor space provides an efficient living space whilst recognising the need for flexibility and future proofing of the building and surrounding landscape.

The inclusion of a ground source heat pump system into the proposed development will ensure that the new dwelling significantly reduces its carbon footprint and provides a significant output of renewable energy to the home – thus, offering the opportunity to create a carbon neutral dwelling in the future through renewable electricity resource technology.