SUSTAINABILITY STATEMENT & ENERGY STRATEGY TABLE

42 - 46 Baldwin Street Bristol BS1 1PN

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Description of works

Extension of existing office floorspace on 6th storey, including perimeter terrace space, and extension and refurbishment to existing communal terrace on 7th storey including pergola, with associated works.

Use

Office (Class E)

Planning Policy Context

The suite of policies BCS 13, 14 and 15 apply in the case of this proposal.

Bristol Core Strategy Policy BCS13 sets out that development should contribute to both mitigating and adapting to climate change, and to meeting targets to reduce carbon dioxide emissions.

Policy BCS14 sets out that development in Bristol should include measures to reduce carbon dioxide emissions from energy use by minimising energy requirements, incorporating renewable energy sources and low-energy carbon sources.

Development will be expected to provide sufficient renewable energy generation to reduce carbon dioxide emissions from residual energy use in the buildings by at least 20%.

Policy BCS15 sets out that sustainable design and construction should be integral to new development in Bristol. Consideration of energy efficiency, recycling, flood adaption, material consumption and biodiversity should be included as part of a sustainability or energy statement.

The aspiration is therefore to achieve a 20% reduction in C02 emissions from the proposed development.

Sustainable Design and Construction

<u>Waste and recycling</u>

Suitable provision is already in place for the storage of refuse and recycling containers, with sufficient capacity to accommodate the proposed increase in office floorspace.

Materials

The scheme will show consideration of the need to use materials with a reduced energy input e.g. considering the re-use of existing on-site materials, recycled materials, or through reference to BRE Green Guide. BRE Green Guide A rated materials will be specified wherever possible.

Flexibility and adaptability

The scheme shows consideration of the need to design buildings which will be adaptable in future in terms of their use and the future incorporation of energy saving technologies.

ICT

The new office floorspace will be provided with a connection for internet usage.

Reducing water consumption

The water usage will be restricted using appropriate water saving equipment throughout the office floorspace and welfare/amenity areas.

Sustainable Energy Options

Solar water heating systems are one of the more familiar renewable technologies used at the moment. They use the energy from the sun to heat water, most commonly for hot water needs.

Solar heating systems use a heat collector that is usually mounted on a roof in which a fluid is heated by the sun. This fluid is used to heat water that is stored in either a separate hot water cylinder or in a twincoil hot water cylinder (the second coil is used to provide additional heating from a boiler or other heat source).

Solar hot water panels could not provide the 20% target.

Wind turbines convert the kinetic energy in wind into mechanical energy that is then converted to electricity. Turbines are available in a range of sizes and designs and can either be free-standing, mounted on a building or integrated into a building structure.

For a development in this location only a building mounted turbine could be considered however due to the character, aesthetics and location of the building it would not be feasible. In addition the windspeed in the area is under the advised minimum.

Biomass Heating Biomass is any plant-derived organic material that renews itself over a short period. Biomass energy systems are based on either the direct or indirect combustion of fuels derived from those plant sources. The most common form of biomass is the direct combustion of wood in treated or untreated forms.

The use of biomass is becoming increasingly common in some European countries (some countries such as Austria are heavily dependent on biomass). The environmental benefits relate to the significantly lower amounts of energy used in biomass production and processing compared to the energy released when they are burnt. This can range from a four-fold return for biodiesel to an approximate 20-fold energy return for woody biomass. Biomass-fuels can be used to produce energy on a continuous basis (unlike renewables such as wind or solar energy) and it can be an economic alternative to fossil fuels as it is a potential source of both heat and electricity.

However Biomass systems have particular design management and maintenance requirements associated with sourcing, transportation and storage. It can be less convenient to operate than mains-supplied fuels such as natural gas and are more management intensive and require expertise in facilities management. Sources of biomass can also fluctuate, so boilers should be specified to operate on a variety of fuels without risk of overheating or tripping out.

A communal biomass system would not be feasible for this development due to use, space and maintenance issues. The system would be quite large and there is very little space around the property to locate the boiler, hopper and fuel store that is suitable for deliveries but also appropriate for feeding the boiler.

A heat pump is a device that takes up heat at a certain temperature and releases it at a higher temperature. The essential components of a heat pump are heat exchangers (through which energy is extracted and emitted) and a means of pumping heat between the exchangers. The effectiveness of the heat pump is measured by the ratio of the heating capacity to the effective power input, usually known as the coefficient of performance (COP).

Ground-source heat pumps (GSHP) extract heat from the ground. They are classified as either water to-air or water-to-water units depending on whether the heat distribution system in the building uses air or water. Ground source heat pumps either use long shallow trenches or deep vertical boreholes to take low grade heat from the ground and then compress it to create higher temperatures. Ground source heat pumps would not be suitable due to the lack of land space around the property.

Air Source Heat pumps Air source heat pumps absorb heat from the outside air. This is usually used to heat radiators, under floor heating systems, or warm air convectors and hot water in your home. An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. The system performs down to air temperatures of -20°c which means that they are more than suitable for installations within the UK. Hot water and Heating can be provided 365 days a year. The hot water is produced without the aid of electrical immersions and at 55°c is more than hot enough for baths and showers.

There are two main types of air source heat pump system: An air-to-water system distributes heat via your wet central heating system. Heat pumps work much more efficiently at a lower temperature than a standard boiler system would. So they are more suitable for under-floor heating systems or larger radiators, which give out heat at lower temperatures over longer periods of time.

An air-to-air system produces warm air which is circulated by fans to heat your home. They are unlikely to provide you with hot water as well. Air Source heat pump based heating & hot water would not be feasible, mainly due to space constraints.

There are also concerns around meeting the overall heat demand of the development using air source heat pumps. It is unlikely to be possible to upgrade it to such a standard that would facilitate the provision of a low temperature distribution system such as ASHP.

Photovoltaic (PV) modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases of silicon. Through a process called doping, a very small amount of impurities are added to the semiconductor, which creates two different layers called n-type and p-type layers.

Certain wavelengths of light are able to ionise the silicon atoms, which separates some of the positive charges (holes) from the negative charges (electrons). The holes move into the positive or p-layer and the electrons into the negative or n-layer. These opposite charges are attracted to each other, but most of them can only re-combine by the electrons passing through an external circuit, due to an internal potential energy barrier. This flow of electrons produces a DC current. PV panels could be mounted to roof slopes but would have an obvious visual impact.

In summary only PV panels are suitable for installation on this site, solar PV panels have been selected.

Mains gas fired communal system has been selected for heating & hot water given the existing building's arrangements.

Table 1: Table of fabric U values

Element	Non Dwellings Limiting	Non Dwelling Notional	Proposed
Wall	0.26	0.18	0.12
Roof	0.18	0.15	0.15
Floor	0.18	0.15	0.15
Windows	1.6	1.4	1.52
Doors	1.6	1.6	1.52
Air permeability	8	3	-

Table 2: Energy Strategy Table

	Regulated Energy Demand (kW/ yr)	Regulated CO2 emissions (kgCO2/ yr)	CO2 saved	% CO2 reduction
Baseline energy demand and emissions Building Regulations Part L compliance (equivalent to the Target Emissions Rate TER for new build, or building regulations compliant BER for existing buildings	6161	1550		
Proposed scheme after energy efficiency measures	6099	1535	15	1.00
Proposed scheme after energy efficiency measures and CHP (if suitable for the development) or non-renewable district heating –'residual emissions'	-	-	-	-
Proposed scheme after renewables	5471	1192	343	22.00
Total CO2 reduction beyond baseline emissions			358	23.00