

Sustainability & Energy Statement

29 Denton Road, Wokingham

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Executive Summary

This Sustainability and Energy Statement has been prepared in support of a detailed planning application for the change of use of 29 Denton Road, Wokingham from a mixed-use building into a single-family dwelling.

The planning policy does not require a specific reduction in emissions from either energy efficiency measures and/or low-carbon and renewable technologies for change of use applications.

However, throughout the design process, the applicant and design team members have given careful consideration to the sustainability issues relating to the site, and how these can be enhanced in a marketable and feasible manner

The site is located in a sustainable location close to existing facilities and infrastructure.

The water efficiency measures included in the house will ensure the target of 110 litres per person per day is achieved. This is the standard required for new homes. A sample specification is included within the Statement.

The proposals meet the requirements of the planning policy.

1.0 Introduction

This report has been commissioned by Mr H Butterfield and provides a Sustainability and Energy Statement in support of a detailed planning application for the change of use of 29 Denton Road, Wokingham from a mixed-use building into a single-family dwelling.

The report describes the methodology used in assessing the development and the initiatives proposed.

The objective has been to reduce the energy demand to an economic minimum by making investments in the parts of the building that have the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric.

Once a cost-effective structure has been designed, low-carbon and renewable technologies have been considered to provide further emissions reductions.

The following hierarchy has been followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources

The report has been prepared by Ivan Ball of Bluesky Unlimited who are sustainability consultants.

2.0 Planning Policy Context

National Policy

The UK Government published its sustainable development strategy in 1999 entitled “A better quality of life: A strategy for sustainable development in the UK”. This sets out four main objectives for sustainable development in the UK:

- Social progress that recognises the needs of everyone.
- Effective protection of the environment.
- Prudent use of natural resources.
- Maintenance of high stable levels of economic growth and employment.

Sustainable Communities: Building for the Future, known colloquially as the Communities Plan was published in 2003. The Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in parts of the country, low demand in other parts and the quality of our public spaces. The Communities Plan describes sustainable communities as: Active, inclusive and safe, well run, environmentally sensitive, well designed and built, well connected, thriving, well served and fair for everyone.

The most relevant national planning policy guidance on sustainability is set out in:

- National Planning Policy Framework - 2024

Paragraph 161 states;

‘The planning system should support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.’

Local Policy

Wokingham Borough Local Development Framework – Adopted Core Strategy Development Plan Document, January 2010

CP1 – Sustainable development

Planning permission will be granted for development proposals that:

- 1) *Maintain or enhance the high quality of the environment;*
- 2) *Minimise the emission of pollutants into the wider environment;*
- 3) *Limit any adverse effects on water quality (including ground water);*
- 4) *Ensure the provision of adequate drainage;*
- 5) *Minimise the consumption and use of resources and provide for recycling;*
- 6) *Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;*
- 7) *Avoid areas of best and most versatile agricultural land;*
- 8) *Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;*
- 9) *Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);*
- 10) *Provide attractive, functional, accessible, safe, secure and adaptable schemes;*
- 11) *Demonstrate how they support opportunities for reducing the need to travel, particularly by private car in line with CP6; and*
- 12) *Contribute towards the goal of reaching zero-carbon developments as soon as possible by:*
 - a) *Including appropriate on-site renewable energy features; and*
 - b) *Minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.*

CP2 - Inclusive communities

To ensure that new development contributes to the provision of sustainable and inclusive communities (including the provision of community facilities) to meet long term needs, planning permission will be granted for proposals that address the requirements of:

- a) *An ageing population, particularly in terms of housing, health and wellbeing;*
- b) *Children, young people and families, including the co-ordination of services to meet their needs;*
- c) *People with special needs, including those with a physical, sensory or learning disability or problems accessing services; and*
- d) *The specific identified needs of minority groups in the borough, including Gypsies, Travellers and Travelling Showpeople and black and minority ethnic groups. Proposals for gypsies, travellers and travelling showpeople (including allocations in other Development Plan Documents) will demonstrate that:*

- i) *The site is located either within or close to the development limits of a settlement in policy CP9 in order to maximise the possibilities for social inclusion and sustainable patterns of living; and*
- ii) *The proposed site is not disproportionate to the scale of the existing settlement whether singly or cumulatively with any existing sites in the area.*

Wokingham Borough Development Plan – Adopted Managing Development Delivery Local Plan, February 2014

Policy CC01 – Presumption in Favour of Sustainable Development

- 1. *Planning applications that accord with the policies in the Development Plan for Wokingham Borough will be approved without delay, unless material considerations indicate otherwise.*
- 2. *Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise – taking into account whether:*
 - a. *Any adverse impacts of planning permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework (NPPF) taken as a whole; or*
 - b. *Specific policies in the National Planning Policy Framework indicate that development should be restricted.*

Policy CC04: Sustainable Design and Construction

Planning permission will only be granted for proposals that seek to deliver high quality sustainably designed and constructed developments by:

- 1. *In respect of all new homes:*
 - a) *Seeking to achieve the requirements of the full Code for Sustainable Homes Level 4;**
 - b) *Meet internal potable water consumption targets of 105 litres or less per person per day (as part of the requirement to meet full Code for Sustainable Homes Level 4).*

Policy CC05: Renewable energy and decentralised energy networks

- 1. *Local opportunities to contribute towards decentralised energy supply from renewable and low-carbon technologies will be encouraged*
- 2. *Planning permission will only be granted for proposals that deliver a minimum 10% reduction in carbon emissions through renewable energy or low carbon technology where the development is for:*
 - a) *Schemes of more than 10 dwellings (gross), or*
 - b) *Non-residential proposals of more than 1,000 sq m gross floorspace.*

3. *Proposals for renewable energy and decentralised energy works, including wind turbines, must demonstrate that:*
- a) They are appropriate in scale, location and technology type;*
 - b) Are compatible with the surrounding area, including the impact of noise and odour;*
 - c) Do not have a damaging impact on the local topography and landscape;*
 - d) There is no significant impact upon heritage assets, including views important to their setting;*
 - e) In the case of wind turbines, take account of their cumulative effect and properly reflect their increasing impact on the landscape and on local amenity.*

Sustainable Design and Construction SPD, 28th May 2010 and **Companion Document to the Sustainable Design and Construction Supplementary Planning Document**, 28th May 2010.

These documents have been used to inform this Sustainability and Energy Statement.

3.0 Proposal

The proposal is for the change of use of the existing mixed-use building into a single-family dwelling.

The accommodation schedule in details is;

Unit Type	Number	Area
		m ²
3-Bedroom Detached house	1	164.0
	1	164.0

4.0 Energy Efficiency

4.1 Demand Reduction (Be Lean and Be Clean)

Design

The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical.

Passive Solar Gain

Passive measures include allowing for natural ventilation and exposed thermal mass coupled with high levels of insulation, air tightness and the control of solar gain.

The proposal retains all existing window openings so the orientation of the rooms is fixed within the constraints of the existing building. However, the house benefits from multiple aspects and there are openings on all four elevations. These are orientated towards the northwest, northeast, southeast and southwest and therefore the house will enjoy access to direct sunlight throughout the day.

Efficient Building Fabric

Building Envelope

The proposal is for the change of use of an existing building and as such the U-values of the building envelope must meet Building Regulations Part L standards although further improvements will reduce the heating requirements of the dwelling, which will reduce energy demand.

Under the Building Regulations the works may be regarded as a material change of use and therefore it may be necessary to upgrade the existing U-values, to meet those set by the Building Regulations (Part L1 – 2010 as amended in 2021).

Ventilation

As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2021 to address the possibility of overheating and poor air quality. The ventilation to the WCs and Bathroom will be comprised of individual point of use extract units.

Active Design Measures will include;

Efficient Lighting and Controls

Throughout the scheme natural lighting will be optimised.

Part L of the Building Regulations requires all light fittings to have lamps with a minimum luminous efficacy of 80 light source lumens per circuit-watt. It is proposed to achieve this standard.

4.2 Low-Carbon and Renewable Technologies (Be Clean and Be Green)

The carbon dioxide emissions established above have been used to test the viability of various renewable and low carbon technologies as follows. This section determines the appropriateness of each renewable technology.

The Government's Renewable Obligation defines renewable energy in the UK. The identified technologies are;

- Small hydro-electric
- Landfill and sewage gas
- Onshore and offshore wind
- Biomass
- Tidal and wave power
- Geothermal power
- Solar

The use of landfill or sewage gas, offshore wind or any form of hydroelectric power is not suitable for the site due to its location. The remaining technologies are considered below;

Wind

Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.

The Government wind speed database predicts local wind speeds at Denton Road to be 4.7 m/s at 10m above ground level and 5.5 m/s at 25m above ground level. This is below the level generally required for commercial investment in large wind turbines. In addition the land take, potential for noise and signal interference make a large wind turbine unsuitable for this development.

Roof mounted turbines could be used at the development to generate small but valuable amounts of renewable electricity but the small output and contribution to total emissions means any investment would be small and purely tokenism. In addition the use of wind turbines will have a detrimental aesthetic impact on the appearance of the development.

Combined Heat and Power and Community Heating

Combined heat and power (CHP) also called co-generation is a de-centralised method of producing electricity from a fuel and 'capturing' the heat generated for use in buildings. The plant is essentially a small-scale electrical power station.

The production and transportation of electricity via the National Grid is very inefficient with over 65% of the energy produced at the power station being lost to the atmosphere and through transportation.

CHP units are generally gas fuelled and generate electricity with heat being a by-product. The heat is usually used to meet the hot water load, which is fairly consistent throughout the year.

Historically CO₂ savings have been achieved because gas has been used to generate electricity and gas has had a lower emissions factor than electricity. However, with the de-carbonisation of the electricity grid the benefit of CHP is negated.

CHP is not proposed.

Ground Source Heat Pumps

Sub soil temperatures are reasonably constant and predictable in the UK, providing a store of the sun's energy throughout the year. Below London the groundwater in the lower London aquifer is at a fairly constant temperature of 12° C. Ground source heat pumps (GSHP) extract this low-grade heat and convert it to usable heat for space heating.

GSHP operates on a similar principle to refrigerators, transferring heat from a cool place to a warmer place. They operate most efficiently when providing space heating at a low temperature, typically via under floor heating or with low temperature radiators.

Whilst the house is set in a private garden it is unlikely there will be sufficient external ground area to sustain a horizontal collection system and the installation of a ground source heat pump is likely to require the use of a bore hole collection system.

This would be cost prohibitive and a ground source heat pump is not proposed.

Solar

(i) Solar Water Heating

Solar hot water panels use the sun's energy to directly heat water circulating through panels or pipes. The technology is simple and easily understood by purchasers.

Solar hot water heating panels are based generally around two types, which are available being 'flat plate collectors' and 'evacuated tubes'. Flat plate collectors can achieve an output of up to 1,124 kWh/annum (Schuco) and evacuated tubes can achieve outputs up to 1,365 kWh/annum (Riomay).

Whilst the installation of solar hot water heating panels could be feasible this would necessitate a change to the hot water cylinder. This will be explored further at the detailed stage.

Solar hot water heating panels are not proposed at this stage.

(ii) Photovoltaics

Photovoltaic panels (PV) provide clean silent electricity. They generate electricity during 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 can be integrated into many different aspects of a development including roofs, walls, shading devices or architectural panels. The panels typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.

The southeast orientated side roof of the building provides the opportunity to install a number of photovoltaic panels.

Photovoltaic panels are considered an appropriate technology and whilst not proposed at this stage will be explored further at the pre-construction stage.

Air Source Heat Pumps (ASHP)

Air sourced heat pumps operate using the same reverse refrigeration cycle as ground source heat pumps, however the initial heat energy is extracted from the external air rather than the ground. These heat pumps can be reversed to provide cooling to an area although this reduces the coefficient of performance of the pumps.

ASHPs work well when installed to highly energy efficiency buildings with low air permeability. An air source heat pump could be installed to the building following the improvement in the insulation values of the thermal elements.

An ASHP is not proposed at this stage.

5.0 Climate change adaption and Water resources

Sustainable Drainage Systems (SUDS)

The site lies within Flood Zone 1 and is classified as being of low risk.

There is no change to the impermeable area of the site and the volume and rate of runoff will not be altered from the existing site.

Surface Water Management

The house has private gardens and discretely located rainwater butts will be provided to store rainwater for use with landscaping maintenance.

Consideration has been given to the use of grey water recycling. However, the cost of the systems does not currently make them a viable option. They have therefore not been included in the proposals.

Water efficiency measures

In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.

The water efficiency measures included will ensure that the water use target of 105 litres per person per day is achieved. This is the standard required by the planning policy for the new homes.

Water efficient devices will be fully evaluated, and installed, wherever possible. The specification of such devices will be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

The following devices will be incorporated within the house:

- Water efficient taps;
- Water efficient toilets;
- Low output showers;
- Flow restrictors to manage water pressures to achieve optimum levels and
- Water meters.

Below is a typical specification, which would achieve the 110 Litres per person per day target (including five litres per person per day allowance for external water use). This is the equivalent of the 105 litres per person per day required by the planning policy for new homes.

Schedule of Appliance Water Consumption		
Appliance	Flow rate or capacity	Total Litres
WC	6/3 litres dual flush	17.64
Basin	2.0 litres/min.	4.74
Shower	9.0 litres/min	39.33
Bath	175 litres	19.25
Sink	5.0 litres/min	12.56
Washing Machine	6.75 litres/kg	14.18
Dishwasher	1.25 litres/places	4.50
		112.20
	Normalisation Factor	0.91
Total Internal Water Consumption		102.10
External Water Use		5.00
Total Water Consumption		107.10

6.0 Materials and Waste

The BRE Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The proposal involves the change of use of an existing building and therefore the major elements are not proposed to be changed.

However, for new materials the construction specification will prioritise materials within ratings A+, A or B.

Preference will be given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers will be undertaken at the next stage of design.

In addition, timber would be sourced, where practical, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process would be recycled.

All insulation materials to will have a zero ozone depleting potential

Construction waste

Targets will be set to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.

The overarching principle of waste management is that waste should be treated or disposed of within the region where it is produced.

Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes can be reduced through appropriate selection of the construction method, good site management practices and spotting opportunities to avoid creating unnecessary waste.

The Construction Strategy will explore these issues, some of which are set out below:

- Proper handling and storage of all materials to avoid damage;
- Efficient purchasing arrangements to minimise over ordering;
- Segregation of construction waste to maximise potential for reuse/recycling;
- Suppliers who collect and reuse/recycle packaging materials.