Sustainability & Energy Statement

Land to rear of 152 High Street, Old Woking

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23rd October 2023

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Executive Summary

This Sustainability and Energy Statement has been prepared in support of a planning application for the erection of a single, 2-bedroom detached bungalow on land to rear of 152 High Street, Old Woking with associated access and landscaping.

The planning policy is based on the Code for Sustainable Homes, which was revoked in 2015. However, at that time the Government confirmed that local authorities were still able to impose the emissions reduction and water efficiency standard required by what was Code Level 4, i.e. 19% reduction (based on Part L 2013) and 105 litres per person per day. This is the standard required by the planning policy.

SAP calculations have been prepared for the bungalow based upon the construction specification set out within the report and the detailed planning drawings and these provide an accurate assessment of the carbon dioxide emissions arising from the unit and have allowed different systems to be tested.

It is proposed to enhance the fabric insulation standards of the bungalow above the minimum required by the Building Regulations.

In addition, it is also proposed to install an air source heat pump into the bungalow to provide all space heating and hot water from renewable technologies.

The Regulations Compliance Report for the proposed bungalow is attached as Appendix 1 but the reduction in total site emissions can be summarised as follows;

	Emissions	% Reduction
	kg CO_2 per year	
Baseline Emissions (TER)	811	
Be Green Emissions (DER) – using an ASHP	419	**48.34%**

There will be no mains gas connection to the site and therefore there will be no on-site NOx emissions.

The water efficiency measures incorporated within the bungalow will ensure the water use is less than 105 litres per person per day (excluding external water use) and achieves the policy requirement.

The Woking BC Climate Neutral Development Checklist is attached as Appendix 2.

1.0 Introduction

This report has been commissioned by Concept Developments and provides a Sustainability and Energy Statement for the erection of a single, 2-bedroom detached bungalow with associated access and landscaping on land to rear of 152 High Street, Old Woking.

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

The bungalow has been designed and will be constructed to reduce energy demand and carbon dioxide emissions.

The objective is 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 heat and/or electricity.

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 - 2023

Paragraph 152 states;

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk 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

The local policy framework is provided by the **Woking Core Strategy,** which was adopted in October 2012, the **Development Management Policies DPD,** which was adopted in October 2016 and the **Site Allocations DPD**, which was adopted in 2021.

Of particular relevance to this Statement is the following policy;

Woking Core Strategy

CS22: Sustainable construction

New residential development on previously developed land will be required to meet the energy and Carbon Dioxide (CO_2) and water components of the Code for Sustainable Homes level 3 (or any future national requirement) from now until 31 March 2013, the energy and CO_2 and water components of at least Code level 4 from 1 April 2013 and the energy and CO_2 and water components of Code level 5 from 1 April 2016. New residential development is encouraged to meet the full requirements of each Code level, with particular encouragement for the material and ecology elements. Where the scale, nature and location of a development would justify a higher Code level, the Council will negotiate with developers to achieve that because of the lower cost of developing such sites.*

*New residential development on greenfield sites will be required to meet the Code for Sustainable Homes level 5 (or any future national requirement) from now because of the relatively lower cost of developing such sites.**

The Council will consider a case based on evidence of viability if an applicant can demonstrate that the requirement for Code level 5 cannot be met. This will be considered on a case by case basis.

All new development should consider the integration of Combined Heat and Power (CHP) or other forms of low carbon district heating in the development. All new development in proximity of an existing or proposed CHP station or district heating network will be required to be connected to it unless it can be demonstrated that a better alternative for reducing carbon emissions from the development can be achieved. Details of the zones where connection will be required will be set out in an SPD and will be determined by factors such as the capacity of the existing CHP network, distance from it and physical constraints. The evidence base sets out the locations in the Borough, which have significant potential for CHP or other forms of low carbon district heating networks. Subject to technical feasibility and financial viability, all development within these zones will be required to be designed and constructed to enable connection to the future network.

Where it can be demonstrated that the standards set out in this policy cannot be met on site, permission will only be granted if the applicant makes provision for compensatory energy and CO_2 and water savings elsewhere in the Borough equivalent to the carbon savings which would have been made by applying this policy.

The standards set out in the policy will be reviewed to reflect any future change in national standards and/or any equivalent standards that might be introduced.

Electric vehicle charging points

The Council is actively promoting electric vehicle charging points and has already provided a number of these in the Borough. These are of particular value when the electricity source is low carbon. Details of when new development will be expected to provide electric vehicle charging points or when a contribution towards public charging points will be required, will be set out in an SPD.

Design and construction

The design of all new developments will be required to take account of layout, landform, orientation and landscaping to maximise efficient use of energy and adapt to the impacts of climate change.

The design of all new developments should facilitate the reduction of waste and the recycling and composting of the waste produced.

All developments should consider the use of sustainable construction techniques that promote the reuse and recycling of building materials. All development is encouraged to use responsible resourcing of materials and is encouraged to source materials locally. All new residential development is encouraged to meet the 'materials' elements of the Code.

Checklist

All applications for new development should include a completed copy of the Council's climate neutral checklist (with the exception of very minor development such as minor exterior alterations).

Ecology and biodiversity

All development is encouraged to make biodiversity enhancements such as green roofs and bird and bat boxes. All new residential development is encouraged to meet the 'ecology' elements of the Code.

The Council have also published a Supplementary Planning Document entitled **Climate Change**, which was adopted in 2013.

* The Code for Sustainable Homes was revoked in 2015 and full certification is no longer applicable. However, local authorities can require the emissions reduction and water efficiency targets required by Code Level 4, i.e. 19% reduction in emissions and 105 litres per person per day. This is the standard imposed by Woking Borough Council.

3.0 Assessment Methodology

The baseline carbon dioxide emissions from the bungalow have been established using agreed building specifications and detailed planning drawings.

Emission Factors

The CO_2 emission factors, where applicable, used throughout this report have been taken from the Building Regulation Approved Document L - 2021.

	kg CO_2/kWh
Grid supplied and displaced electricity	0.136
Natural gas	0.210

4.0 Proposal

The accommodation schedule in detail is;

Unit Type	Number	Area
		m^2
2-Bedroom, Detached bungalow	1	83.2
Total		**83.2**

5.0 Energy Efficiency

5.1 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 Design Measures

The passive design measures proposed include;

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 layout of the bungalow is in context with the shape of the site and surrounding development and the unit has been designed with aspects towards the north, south, east and west.

The bungalow will enjoy access to direct sunlight throughout the day.

Natural Daylighting

The orientation and the size of the windows have been optimised to maximise the amount of natural daylight and therefore reduce the demand for artificial lighting.

Efficient Building Fabric

Building Envelope

U-values of the building envelope must meet Building Regulations Part L1 standards and further improvements to U-values will reduce the bungalow's heating requirements.

The ground floor will be constructed using a precast concrete beam and block suspended system insulated with 150mm PIR insulation.

The external walls will be built in traditional cavity wall construction with 100mm facing brick, 150mm fully-filled cavity and 100mm lightweight aggregate block internally.

The roof will be insulated with at least 400mm of PIR insulation.

Windows are proposed as double glazed with Low 'e' soft coat and argon filled.

It is proposed to set maximum limits for the elemental U-values as follows:

Element	Part L Limiting U-values	Proposed U-values	Proposed Improvement
	W/m²K	W/m²K	
Ground Floor	**0.18**	**0.13**	**28%**
External Walls	**0.26**	**0.18**	**44%**
Roofs (cold)	**0.16**	**0.10**	**60%**
Windows	**1.60**	**1.20**	**25%**
External Doors	**1.60**	**1.00**	**38%**

Air Leakage

Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration or air permeability) often through poor sealing of joints and openings in the building

The Building Regulations set a minimum standard for air permeability of 8 m^3 of air per hour per m^2 of envelope area, at 50Pa. The SAP modelling has been based on achieving a 50% improvement over Building Regulations and the bungalow will target a permeability of 4.0 $m^3/hr/m^2$ or less.

Thermal Bridging

The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO_2 reduction targets set out in this strategy.

The thermal details for the building will be modelled at the detailed working drawing stage but for the purposes of this assessment the thermal details formulated by the Concrete Block Association have been used. This will enable the building to achieve the higher energy efficiency requirements of the Building Regulations.

The following table provides the values currently used within the modelled SAP calculation.

Reference	Location	PSI Values
		W/mK
E2	Other Lintels (including other steel lintels)	0.058
E3	Sill	0.036
E4	Jamb	0.023
E5	Ground Floor (Normal)	0.165
E10	Eaves (Ceiling)	0.053
E12	Gable (Ceiling)	0.217
E16	Corner (normal)	0.041
E17	Corner (inverted)	-0.062

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.

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 fitting to have lamps with a minimum luminous efficacy of 80 light source lumens per circuit-watt.

Space Heating and Hot Water

The fabric specification has been set out above but the baseline M+E installation includes the installation of an air source heat pump to the bungalow.

5.2 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.

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 High Street to be 4.8 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 low output and contribution to total emissions means any investment would be small and purely tokenism. In addition, the use of wind turbines would have a detrimental aesthetic impact on the appearance of the development and are therefore not proposed.

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 CO_2 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 12º 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 bungalow has a private garden there is insufficient area to sustain a horizontal collection system. The use of a ground source heat pump will therefore require the installation of bore holes, which will be cost prohibitive.

A ground source heat pump is not proposed.

Solar

(i) Solar Water Heating

Solar hot water panels use the suns 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 panels to the dwelling is feasible, the use of an air source heat pump already reduces emissions significantly and the marginal increase in the reduction from the use of a solar hot water panel does not represent good value when considering the additional costs of the panels.

Solar hot water heating panels are not proposed.

(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 roof of the bungalow could accommodate the installation of photovoltaic panels on the west orientated front elevation.

Whilst panels could be installed, they will detrimentally impact on the aesthetics of the bungalow and therefore are not proposed.

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.

It is proposed to install an air source heat pump into the bungalow.

5.3 Establishing Carbon Dioxide Emissions (Be Lean, Be Clean & Be Green)

SAP calculations have been prepared using the Part L 2021 methodology and based on the fabric specification set out above and including the installation of an air source heat pump.

The Summary SAP Report is attached as Appendix 1 but the target dwelling emissions rate (TER), dwelling emissions rate (DER) can be summarised as follows;

Unit Type	TER Emissions	DER Emissions
	kg CO_2/yr	kg CO_2/yr
Space heating	700.61	152.97
Water heating	601.99	237.95
Pumps, fans and electric keep-hot	11.93	0.00
Lighting	27.59	27.59
Energy saving/ generation technologies	-531.52	0.00
Total Emissions	**810.59**	**418.50**
Emission Rate (per m^2)	9.74	5.03

The total emissions allowable through the Building Regulations (TER) are calculated as:

- **811 kg CO_2 per year**

With total actual site emissions (DER) assessed as:

- **419 kg CO_2 per year**

The carbon dioxide emissions are reduced by 392 kg CO_2 per year as a result of the energy efficiency measures and the air source heat pump installed into the bungalow.

This equates to a reduction of 48.34%.

5.4 Summary of Calculations and Proposals for Low-carbon and Renewable Technologies

The total emissions from the site based upon the maximum permissible by the Building Regulations (TER) are calculated as **811 kg CO_2 per year**, with actual (DER) emissions after energy efficiency measures and the installation of an air source heat pump of **419 kg CO_2 per year**.

Various technologies are considered above and whilst wind turbines, combined heat and power, ground source heat pumps and solar hot water heating panels and not appropriate the installation of an air source heat pump is considered feasible and appropriate.

Be Green

The construction standards proposed include U-values, which demonstrate good practice and improve upon those required by the Building Regulations.

Air tightness standards are targeted at a 50% improvement upon the minimum required by the Building Regulations.

The reduction in emissions as a result of the fabric specification and the installation of an air source heat pump are **392 kg CO_2 per year**, which equates to a reduction of **48.34%.**

The planning policy requires a reduction of at least 19% and therefore the proposal significantly exceeds this requirement.

6.0 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.

Surface Water Management

Consideration has been given to the use of grey water recycling. However, occupier's resistance to the appearance of the recycled water and 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 (excluding external water use).

Water efficient devices have been evaluated and will be installed. 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 bungalow:

- 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 105 Litres per person per day target (excluding five litres per person per day allowance for external water use).

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 Water Consumption	102.10

7.0 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 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.

Appendix 1 – Summary SAP Report for the Proposed Bungalow

Summary for Input Data

elmhurst energy

Property Reference	Woking 2BH DET BUNG 83	**Issued on Date**	23/10/2023
Assessment Reference	Woking 2BH DET BUNG 83	**Prop Type Ref**	2BH DET BUNG 83
Property	Rear of 152, High Street, Old Woking, Surrey, GU229JH		

SAP Rating	79 C	**DER**	5.03	**TER**	9.74
Environmental	96 A	**% DER < TER**			48.36
CO_2 Emissions (t/year)	0.39	**DFEE**	42.64	**TFEE**	44.38
Compliance Check	See BREL	**% DFEE < TFEE**			3.93
% DPER < TPER	-1.01	**DPER**	52.83	**TPER**	52.30

Assessor Details	Mr. Ivan Ball	**Assessor ID**	X001-7283
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	Southwest	
Property Tenture	1	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Bungalow, Detached	
2.0 Number of Storeys	1	
3.0 Date Built	2023	
4.0 Sheltered Sides	3	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Enter TMP value	
Thermal Mass	250.00	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	43.00 m	83.20 m²	2.50 m

8.0 Living Area 20.24 m²

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, dense block, filled cavity, any outside structure	0.18		107.50	84.98	0.00	None	22.52	Enter Gross Area

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
External Roof	External Flat Roof	Plasterboard, insulated flat roof	0.10	9.00	83.20	83.20	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
Heatloss Floor 1	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.11	None	0.00	75.00	83.20

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Opening Type 1	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Hall	Opening Type 1	External Wall 1	West	1.89	
Hall	Opening Type 1	External Wall 1	West	0.95	
Hall/ Utility	Opening Type 1	External Wall 1	West	1.58	
Kitchen	Opening Type 1	External Wall 1	West	1.58	
Living	Opening Type 1	External Wall 1	West	1.80	
Living	Opening Type 1	External Wall 1	South	7.88	
Dining	Opening Type 1	External Wall 1	East	0.90	

Summary for Input Data

elmhurst energy

Bedroom 2	Opening Type 1	External Wall 1	East	1.80
Bathroom	Opening Type 1	External Wall 1	East	0.79
Master Bed	Opening Type 1	External Wall 1	North	3.38

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	

17.0 Thermal Bridging	Calculate Bridges	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E5 Ground floor (normal)	Non Gov Approved Schemes	43.00	0.17	0.17	No
E2 Other lintels (including other steel lintels)	Non Gov Approved Schemes	14.85	0.06	0.06	No
E3 Sill	Non Gov Approved Schemes	9.75	0.04	0.04	No
E4 Jamb	Non Gov Approved Schemes	27.00	0.02	0.02	No
E16 Corner (normal)	Non Gov Approved Schemes	15.00	0.04	0.04	No
E17 Corner (inverted – internal area greater than external area)	Non Gov Approved Schemes	5.00	-0.06	-0.06	No
E10 Eaves (insulation at ceiling level)	Non Gov Approved Schemes	31.73	0.05	0.05	No
E12 Gable (insulation at ceiling level)	Non Gov Approved Schemes	11.12	0.22	0.22	No

Y-value	0.05	W/m²K

18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	

19.0 Mechanical Ventilation

Mechanical Ventilation

Mechanical Ventilation System Present	No	

20.0 Fans, Open Fireplaces, Flues

21.0 Fixed Cooling System	No	

22.0 Lighting

No Fixed Lighting	No	

Name	Efficacy	Power	Capacity	Count
Lighting 1	80.00	5	400	50

24.0 Main Heating 1	Database	
Percentage of Heat	100.00	%
Database Ref. No.	102608	
Fuel Type	Electricity	
In Winter	317.48	
In Summer	163.64	
Model Name	aroTHERM 5kW	
Manufacturer	Vaillant Group UK Ltd	
System Type	Heat Pump	
Controls SAP Code	2208	
Is MHS Pumped	Pump in heated space	
Heating Pump Age	2013 or later	
Heat Emitter	Radiators and Underfloor	
Underfloor Heating	Yes - Pipes in Concrete	
Flow Temperature	Enter value	
Flow Temperature Value	35.00	

25.0 Main Heating 2	None	

26.0 Heat Networks	None	

	Heat Source	Fuel Type	Heating Use	Efficiency	Percentage Of Heat	Heat	Heat Power Ratio	Electrical	Fuel Factor	Efficiency type
Heat source 1										
Heat source 2										

Heat source 3
Heat source 4
Heat source 5

28.0 Water Heating

Water Heating	Main Heating 1	
SAP Code	901	
Flue Gas Heat Recovery System	No	
Waste Water Heat Recovery Instantaneous System 1	No	
Waste Water Heat Recovery Instantaneous System 2	No	
Waste Water Heat Recovery Storage System	No	
Solar Panel	No	
Water use <= 125 litres/person/day	No	
Cold Water Source	From mains	
Bath Count	1	
Immersion Only Heating Hot Water	No	

28.3 Waste Water Heat Recovery System

29.0 Hot Water Cylinder	Hot Water Cylinder	
Cylinder Stat	No	
Cylinder In Heated Space	No	
Independent Time Control	No	
Insulation Type	Measured Loss	
Cylinder Volume	200.00	L
Loss	1.20	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	

31.0 Thermal Store	None	
34.0 Small-scale Hydro	None	

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
	£4,000 - £6,000	£75	B 81	A 96
	£3,500 - £5,500	£247	B 90	A 98
			0	0

Appendix 2 – Woking Borough Council Climate Neutral Checklist

Applicants' Climate Neutral Development Checklist

This checklist is to be read in conjunction with the Council's Climate Change Supplementary Planning Document, which gives detailed guidance on the implementation of policies CS22 'Sustainable construction', and CS23 'Renewable and low carbon energy generation' of the Core Strategy.

Application Site Address
Enter Address
Land to rear of 152 High Street, Old Woking

1. Location & Transport **Policies achieve climate neutrality by:** lowering greenhouse gas emissions by reducing the need to travel and distance travelled; increasing the proportion of travel by sustainable modes such as walking, cycling, public transport and lower carbon vehicles; and reducing climate change vulnerability by locating development away from areas liable to flooding.	**Yes**	**No**	**N/a**
Have you considered including measures to reduce dependence on private car-borne transport and influence a shift to more sustainable modes of travel?	✔		
Does the proposal provide appropriate levels and standards of parking (including cycle parking)?	✔		
Will the development incorporate facilities for charging plug-in and other ultra-low emission vehicles as appropriate?	✔		
Have you submitted a Travel Statement (for smaller-scale developments) or Travel Plan (for proposals that generate significant traffic) with your proposal?		✔	
Does the location of the proposed development minimise distances to the main employment centres, shops, recreation and community facilities and schools?	✔		
Have you ensured the development is located away from an area liable to flooding, and is not dependent on transport links (roads, footpaths etc.) liable to flooding?	✔		

2. Layout & Design **Policies achieve climate neutrality by:** lowering greenhouse gas emissions by reducing energy demands for heating and cooling; and building in resilience to the impacts of climate change such as flooding and heat through good layout and design.	**Yes**	**No**	**N/a**
Does the proposed site layout maximise the potential for passive solar gain?	✔		
Have you considered how buildings could be designed to maximise the capture and use of passive solar energy?	✔		
Have you considered designing in measures to prevent excess solar gain in summer?	✔		
Have you designed the layout to use landform and landscape to benefit from shelter?	✔		
Have you considered the potential for passive cooling and ventilation in summer?	✔		
Have you considered how existing and proposed trees and shrubs could be used to provide shade for car parks and other private and public open space?	✔		

3. Energy and carbon reduction **Policies achieve climate neutrality by:** reducing greenhouse gases by promoting developments that reduce the need for energy, use energy efficiently, supply energy efficiently and use renewable or low or zero carbon technologies.	**Yes**	**No**	**N/a**
Have you considered designing in measures to maximise energy efficiency?	✔		
Have you explored ways to secure a proportion of energy demand through the installation of renewable and/or low and zero carbon technologies?	✔		
Have you checked whether your proposed development falls within a 'Potential District Heat Area', or a zone requiring buildings to be 'CHP Ready'?	✔		

4. Water & Drainage **Policies achieve climate neutrality by:** incorporating adaptation measures to ensure development is resilient to increased risk of flooding or droughts; and reducing water demand and increasing more efficient use of water as periods of drought increase.	**Yes**	**No**	**N/a**
Have you considered designing in water efficient fittings and appliances?	✔		
Have you considered incorporating rainwater recycling and harvesting systems?	✔		
Have you considered incorporating recycling and harvesting facilities for grey water?	✔		
Have you considered designing in measures to minimise surface water run-off e.g. minimising paved areas and impermeable surfaces?	✔		
Have you considered incorporating sustainable urban drainage (SUDS) into your development proposal?[1]	✔		
Have you considered how any SUDS techniques used will achieve wider ecosystem functions? E.g. contribution to amenity, recreation, wildlife etc.	✔		
Have you defined maintenance responsibilities for any proposed SUDS?	✔		

5. Waste & Materials **Policies achieve climate neutrality by:** facilitating the reduction, recycling and reuse of waste and providing opportunities to improve materials resource efficiency to reduce greenhouse gases.	**Yes**	**No**	**N/a**
Have you considered how the design of the development can facilitate the reduction of waste and the recycling and composting of waste generated by occupants?	✔		
Have you adopted procedures which will minimise construction waste e.g. re-use and recycle waste?	✔		
Have you considered using locally and/or responsibly sourced building materials?	✔		
Does the proposal encourage the use of re-used, recycled, recyclable and durable products e.g. salvage material or re-using/recycling demolition materials for hardcore and aggregate?	✔		

6. Green Infrastructure & Ecology **Policies achieve climate neutrality by:** adapting the built environment to climate change impacts such as flooding, high temperatures and the urban heat island effect, whilst delivering a wide range of additional social, economic and environmental benefits such as biodiversity enhancements.	**Yes**	**No**	**N/a**
Does the proposal include the provision of green and blue spaces? E.g. parks, green corridors, water bodies and sustainable drainage systems.	✔		
Have you considered how green and blue spaces within the development will be connected to the wider green infrastructure assets of the Borough?			✔
If the development involves the loss of any open space, is alternative and equivalent or better provision made elsewhere, or is the development directly related to the enhancement of the open space?			✔
Will the proposal avoid any loss of trees, hedgerows and other vegetation of amenity and/or environmental significance?	✔		
Have you considered adopting measures to conserve, enhance and/or restore biodiversity in and around the development?	✔		
Will you be protecting existing ecological features from damage during site preparation and completion of construction works where practicable?	✔		
If the proposed development is likely to cause adverse impacts to designated landscape sites, have adequate mitigation measures been proposed?			✔
Does the proposal provide for on-going management of green and blue spaces, including biodiversity habitats?			✔

[1] From 6 April 2015 all 'major' planning applications must consider sustainable drainage systems – see the Council's Advice Note.