Energy Statement

Project: 42 Van Diemans Lane, Oxford, OX4 3QD
Date: V2 - 26/03/2024

Contents

1. Introduction

This Energy Assessment has been prepared by Energytest ltd in support of a planning application for the development of 42 Van Diemans Lane, Oxford, OX4 3QD.

The proposal is the demolition of the existing dwelling and the erection of 1x 2 and 1x 4 bedroom dwelling.

The statement provides an initial assessment of the CO2 emissions of the dwelling using approved standard calculation methods (SAP 10), reviews the various options for renewable technologies and demonstrates how the planning condition will be met by implementing appropriate fabric efficiency measures and renewable and/or low energy technologies.

1.1 Development

The application involves the demolition of an existing house and the erection of 2x dwellings.

- Plot 1 (blue) is the end terrace dwelling and comprises 3 bedrooms over 3 storeys. The total floor area is ~90.6m^2.
- Plot 2 (red) is the mid terrace dwelling, comprising 4 bedrooms over 3 storeys. The total floor area is slightly larger at ~106.5m^2.

The development is to be constructed using a traditional masonry cavity construction with high performing insulation. The fabric efficiency will be good, utilising high levels of insulation, high performance glazing and air tightness - above the requirements of Approved Document L1 2021.

1.2 Planning Condition

This Energy Statement will address the Oxford Local Plan 2036, adopted on the 8th of June 2020. Mainly addressing Policy RE1: Sustainable design and construction.

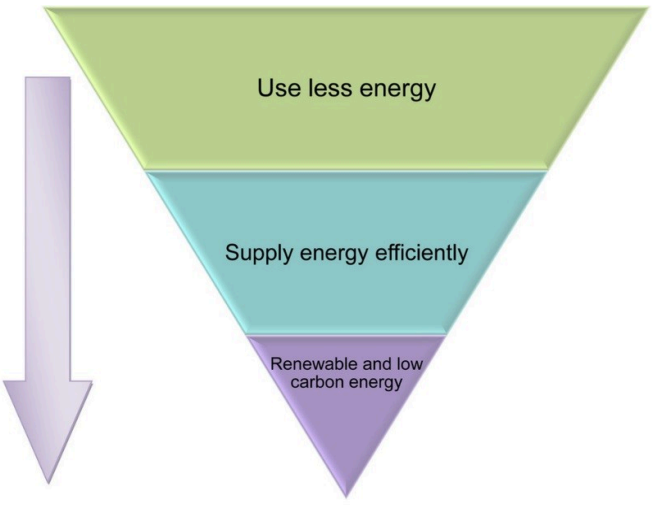
> ***Policy RE1: Sustainable design and construction***
>
> *Planning permission will only be granted where it can be demonstrated that the following sustainable design and construction principles have been incorporated, where relevant:*
>
> *a) Maximising energy efficiency and the use of low carbon energy;*
> *b) Conserving water and maximising water efficiency*
> *c) Using recycled and recyclable materials and sourcing them responsibly;*
> *d) Minimising waste and maximising recycling during construction and operation;*
> *e) Minimising floor risk including floor resilient construction;*
> *f) Being flexible and adaptable to future occupier needs; and*
> *g) Incorporating measures to enhance biodiversity value*

The development proposal must demonstrate a reduction in predicted CO_2 emissions of at least 40% against Building Regulations Part L 2013 standards (or future equivalent legislation)*.

**Since the Oxford Local Plan 2036 was written and implemented, Part L has changed to the 2021 version - it is this version that this statement and associated assessments (SAP) will be compared against.*

This statement will outline how the development is to make the contribution to minimising carbon dioxide emissions, in accordance with the following energy hierarchy:

1. Use less energy
2. Supply energy efficiently
3. Use renewable energy



Proposals for new residential developments are to meet the higher water efficiency standards within the 2013 Building Regulations Part G2 water consumption target of 110 litres per person per day.

2. Energy & Carbon Emissions

The following section will detail how the development is designed and operated in a way to reduce energy demand and subsequent carbon emissions.

2.1 Baseline CO_2 Emissions

The baseline CO_2 emissions for this development have been calculated as per the minimum requirements of 2021 Approved Document L1 of the Building Regulations, with primary heating and hot water to be provided by a mains gas-fired condensing boiler.

The following results were calculated:

Plot	TER ($kgCO_2/m^2$)	TPER (kWh/m^2)	TFEE (kWh/m^2)
Plot 1 (end)	11.16	58.32	35.07
Plot 2 (mid)	10.16	53.09	32.21

2.2 Use Less Energy

The first step of the energy hierarchy is to “use less energy”. This involves improving the building fabric above and beyond the Building Regulations target to reduce the demand for energy.

The following U Values are included within the assessments:

Element	U Value
Ground Floor	0.12
Exposed First Floor	0.18

External Walls	0.18
Sloping Roof	0.16
Loft Roof	0.11
Flat Roof	0.14
Glazing and Doors	1.20

- Thermal bridging will be kept to a minimum via the care and continuity of insulation. Following Registered Construction Details, for example.
- The dwellings will also be air tight - a design air permeability rate of 5 has been set.

This specification ensures that the Dwelling Fabric Energy Efficiency (DFEE) exceeds the Target Fabric Energy Efficiency (TFEE).

Plot	TFEE (kWh/m^2)	DFEE (kWh/m^2)	% Variance
Plot 1 (end)	35.07	33.32	4.98
Plot 2 (mid)	32.21	31.89	0.99

High levels of natural daylight will be provided, wherever possible, through effective window design. The glazing specification for the new development will be enhanced to ensure that they provide good thermal performance along with solar reflectance to minimise solar heat gains during the hot, summer months. The glazing will also have high daylight transmittance factors to maximise daylight factors. Encouraging daylight to penetrate the building is key to reducing light from artificial sources, this reducing energy requirements.

2.3 Supply Energy Efficiently

The second step in the energy hierarchy is to supply energy efficiently. This involves connecting to a District Energy Network - if this is not possible, then efficient services should be implemented across the build.

The developers will make every effort so to supply energy efficiently within this development:

Space Heating	Efficient mains gas boilers - (Worcester Greenstar 8000 Style* models specified for now)
Hot Water	Combi boiler
Ventilation	System 1 - intermittent extract fans in kitchen and each wet room
Lighting	Low energy lighting throughout
Appliances	Any supplied appliances will be efficient models
Vehicle charging	Electric vehicle charging points will be supplied on each plot

** or similar - it is advised to check alternative models*

This specification ensures that the Dwelling Primary Energy Rate (DPER) exceeds the Target Primary Energy Rate (TPER)

Plot	TPER (kWh/m^2)	DPER (kWh/m^2)	% Variance
Plot 1 (end)	58.32	54.35	6.80
Plot 2 (mid)	53.09	50.72	4.47

2.4 Use Renewable Energy

The developers are going to implement Solar photovoltaic panels for each dwelling. These will be ground mounted and orientated South.

A 3.00kWp array has been specified for each house.

Other renewable technologies that could be implemented on this project include:

- **Solar thermal panels** - these generate domestic hot water, and like PV work best when orientated South.
    - Unlike PV, solar thermal only requires 1 or 2 panels to have a measurable impact. This could feasibly be installed on the South facing roof of each plot.

- **Air source heat pump** - Although not renewable technology, ASHP's are considered a low carbon technology due to their extremely high efficiencies. A heat pump could feasibly be installed though there may be issues in terms of noise and siting, and potential back-up required in excessively cold spells.

2.5 Results

The following results were calculated:

HT	TER	DER	%	TPER	DPER	%	TFEE	DFEE	%
P1	11.16	10.40	6.81	58.32	54.35	6.80	35.07	33.32	4.98
P2	10.16	9.72	4.33	53.09	50.72	4.47	32.21	31.89	0.99

As the table shows, compliance with Part L is achieved based on the specification outlined in this document.

The DER (dwelling CO_2 Emission Rate) is at least 69% better than the notional requirements of Part L Building Regulations, which complies with the requirements of Policy RE1: Sustainable design and construction.

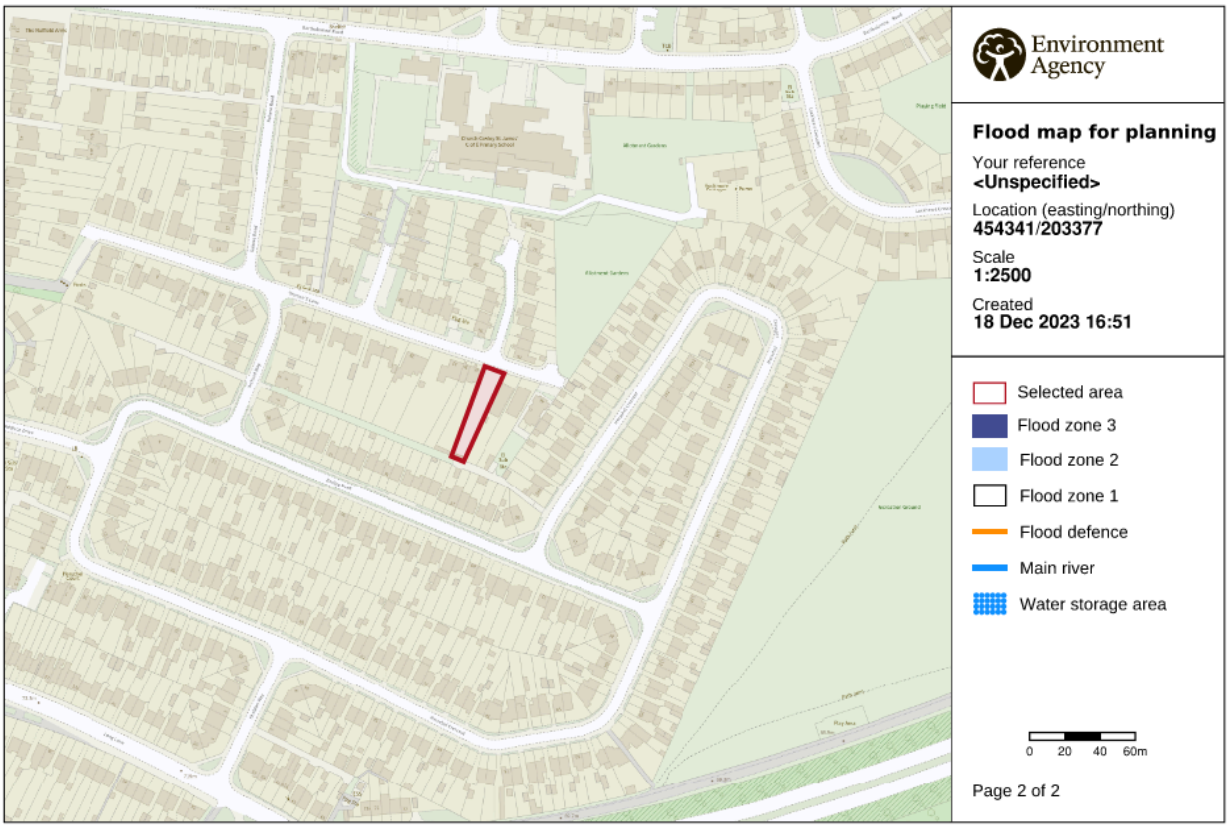
3. Design Measures

The following design measures are incorporated to maximise energy efficiency and conservation:

- Following the theory of the energy hierarchy (as outlined in section 2):
    - Use of sufficient insulation levels and high performance double glazing, to ensure the fabric efficiency is high (reducing the need for energy)
    - Energy will be supplied efficiently, incorporating highly efficient gas boilers for space heating and hot water. EV charging points will be provided
- Construction materials will be selected in a way to reduce the environmental impact:
    - Sustainably and locally sourced materials

- Use of recycled or reclaimed materials where possible - such as recycled or secondary aggregate
- Construction and operational waste will be kept to a minimum

- Landscaping and planting
  - Each dwelling will have gardens. Trees and hedges will be planted and/or retained.
    - This encourages biodiversity and wildlife
    - They can help keep the properties in cooler months
    - Reduces surface water run off and increases rainwater absorption
  - Permeable paving will be included
- Flood Risk - the development lies with flood zone 1 of the Environment Agency's flood risk map. This means there is a ow risk of flooding



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4. Water Usage

In order to comply with Part G of the building regulations new homes must not exceed a water efficiency standard of 125 litres per person per day. However, Policy RE1 requires a water efficiency to achieve a water standard of 110 litres per person per day.

The water consumption for this project has been calculated as per the standard calculation methodology issued by the DCLG which takes into account the dwelling's assumed occupancy and the number of fixtures/fittings and their associated water use.

4.1 Specification

The calculation has been based on the following fixtures / fittings and their corresponding water usage rates:

Fixture / Fitting	Water Usage
Basin Taps	5 litres per minute (or less)
Kitchen Tap	5 litres per minute (or less)
WCs	6 litres full flush, 3 litres part flush
Showers	8 litres per minute (or less)
Baths	200 litres to overflow
Washing Machine	(If supplied) - To use 6.50 litres per kg dry load
Dishwasher	(If supplied) - To use 0.90 litres per place setting

Notes -Water usage can be reduced further through the implementation of grey or rainwater harvesting.

4.2 Results

House type	Water Usage Rate
Plot 1 (end)	108.31 litres per person per day
Plot 2 (mid)	108.31 litres per person per day

As the table shows, both house types achieve a water usage rate under 110 litres per person per day. This therefore complies with Policy RE1.

Table A1: The water efficiency calculator

Installation type	Unit of measure	Capacity/ flow rate	Use factor	Fixed use (litres/person/day)	Litres/person/day
WC (single flush)	Flush volume (litres)	0.00	4.42	0.00	0.00
WC (dual flush)	Full flush volume (litres)	6.00	1.46	0.00	8.76
	Part flush volume (litres)	3.00	2.96	0.00	8.88
WCs (multiple fittings)	Average effective flushing volume (litres)	0.00	4.42	0.00	0.00
Taps (excluding kitchen/utility room taps)	Flow rate (litres/minute)	5.00	1.58	1.58	9.48
Bath (where shower also present)	Capacity to overflow (litres)	200.00	0.11	0.00	22.00
Shower (where bath also present)	Flow rate (litres/minute)	8.00	4.37	0.00	34.96
Bath only	Capacity to overflow (litres)	0.00	0.50	0.00	0.00
Shower only	Flow rate (litres/minute)	0.00	5.60	0.00	0.00
Kitchen/utility room sink taps	Flow rate (litres/minute)	5.00	0.44	10.36	12.56
Washing machine	Litres/kg dry load	6.50	2.10	0.00	13.65
Dishwasher	Litres/place setting	0.90	3.60	0.00	3.24
Waste disposal unit	Litres/use	0.00	3.08	0.00	0.00
Water softener	Litres/person/day	0.00	1.00	0.00	0.00

Total calculated use = (sum column (4))	113.53
Contribution from greywater (litres/person/day) from table 4.6	0.00
Contribution from rainwater (litres/person/day) from table 5.5	0.00
Normalisation factor	0.91
Total water consumption	103.31
External water use (fixed)	5.00
Total water consumption (litres/person/day)	108.31

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5. Conclusion

Compliance with Policy RE1 is achieved:

- Carbon emissions are reduced by following the theory of the energy hierarchy
    - Plot 1 DER exceeds the TER by 6.81%
    - Plot 2 DER exceeds the TER by 4.33%
- Design measures are included to reduce carbon emissions and maximise energy efficiency
- Water usage is reduced through the incorporation of efficient fixtures/fittings. A water usage rate of 108.31 litres per person per day is achieved - this can be further reduced by incorporating grey or rainwater harvesting