



W E Black Ltd

Proposed development at: r/o Warren Road, Ickenham

Energy Statement

20th March 2023

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Introduction

This report has been prepared on behalf of W E Black Ltd to demonstrate compliance with Planning Condition 6 which states;

Prior to the commencement of the development hereby approved, a sustainability and energy statement shall be submitted to and approved in writing by the Local Planning Authority. The sustainability and energy statement shall demonstrate how a 10% reduction in carbon dioxide emissions beyond Building Regulations requirement Part L 2021 (TER Baseline) has been achieved including full technology specifications and locations. Thereafter, the development shall be carried out in accordance with the approved details.

Reason: To ensure the development contributes to minimising the effects of and can adapt to a changing climate in accordance with Policies DMEI 2 and DMEI 10 of the Hillingdon Local Plan: Part 2- Development Management Policies (2020) and Policy SI 2 of the London Plan (2021).

In line with Planning Policy, this site must incorporate a 10% Carbon reduction.

There are four dwellings to be built, which are subject to the Building Regulations Part L Conservation of Fuel and Power 2021. This regulation requires an assessment of the dwelling's energy requirements demonstrated in SAP 10 software outputting a property's:

- Carbon footprint (Dwelling Emission Rate (DER)) expressed in $\text{kg}/\text{CO}_2/\text{m}^2$
- Fabric Energy Efficiency (DFEE) expressed in $\text{kWh}/\text{m}^2/\text{year}$
- Primary Energy Rate (DPER) expressed in $\text{kWh}/\text{m}^2/\text{year}$

The DER & DPER levels are determined upon a property's insulation level, its heating system and controls and/or renewable technology. The DFEE is influenced by insulation levels, heat loss through thermal bridging and thermal Mass.

The baseline for the energy reduction is the Target Emission Rate (TER). The TER sets a dwelling target for each property based upon a notional building of the same type, size and shape and sets a minimum allowable standard of energy performance for that dwelling. The TER becomes the maximum permissible carbon emissions associated with the dwelling to comply with Building Regulations Part L.

The Site

The proposed site will have four detached houses.



Figure 1: Site layout

Carbon Reduction Calculation

The total Carbon requirement (DER) of the dwellings is calculated based on the SAP specification below.

Table 1: Carbon Reduction

Dwelling	DER	TER
Plot 1	3.35	10.26
Percentage Reduction		67.35%
Plot 2	3.16	9.69
Percentage Reduction		67.39%
Plot 3	3.31	10.23
Percentage Reduction		67.64%
Plot 4	3.24	9.77
Percentage Reduction		66.84%

The actual Carbon usage for Plot 1 is 3.35kg/CO₂/m², this is a 67.35% reduction in carbon emissions compared to the TER.

The actual Carbon usage for Plot 2 is 3.16kg/CO₂/m², this is a 67.39% reduction in carbon emissions compared to the TER.

The actual Carbon usage for Plot 3 is 3.31kg/CO₂/m², this is a 67.64% reduction in carbon emissions compared to the TER.

The actual Carbon usage for Plot 4 is 3.24kg/CO₂/m², this is a 66.84% reduction in carbon emissions compared to the TER.

Carbon Reduction

Air Source Heat Pump (ASHP)

Air Source Heat Pumps work by extracting heat from the air itself. The process works similar to a refrigeration technology in that heat is extracted from a source – the outside. Heat is drawn into a heat exchanger where the useable temperature can be used to heat up air or water.

Any unwanted air is then sent back out to the external environment. As temperatures in the UK drop during winter months, heat pump technology has been tested to still work in temperatures at -15 Degrees Celsius as some heat is still extracted. The two most common forms of air source heat pump technology are:

- **Air to air** heat pumps provide warm air distributed through fans around the home. A good building fabric should be provided with any heat pump installation as they work at much lower temperatures than a traditional heating system.
- **Air to water** heat pumps extract heat from the outside air and use it to heat water to be used in a wet heating system. As heat pumps run at a much lower temperature it is recommended that underfloor heating is used, or radiators must be oversized.

The efficiency of an ASHP is measured in coefficient of performance (CoP). The CoP figure identifies how much heat the pump can generate for each unit of power it receives. For example, if an ASHP has a CoP of 3, this means 3 units of heat can be generated per one unit of electricity. Typically, air source heat pumps have a CoP between 2.4 and 4.

Energy Savings

It is suggested that heat pumps can be up to 50% more efficient compared to gas boilers. This will reduce the carbon emissions associated with heating a dwelling and reduce the costs of the heating bills by up to £500 per year.

Energy suppliers have suggested that if heat pump technology is installed, over a 10-year period, a dwellings carbon emission could be reduced by approximately 23 tonnes.

Each plot on site will have an air source heat pump installed to achieve the 10% carbon reduction.

SAP Specification

Brick wall:

Brickwork
150mm Insulation 32 (K = 0.032 Dritherm 32, Isover Hi-Cav 32, Ursa 32)
100mm Plasmor Aglite
Plasterboard on dabs
Plaster skim
U-Value = 0.18W/m²K

Tile wall:

Hung tiles*
100mm Plasmor Aglite
150mm Insulation 32 (K = 0.032 Dritherm 32, Isover Hi-Cav 32, Ursa 32)
100mm Plasmor Aglite
Plasterboard on dabs
Plaster skim
U-Value = 0.18W/m²K
**Block suitability for tile fixings to be checked by fixing supplier*

Garage wall:

100mm Plasmor Aglite
150mm Insulation 32 (K = 0.032 Dritherm 32, Isover Hi-Cav 32, Ursa 32)
100mm Plasmor Aglite
Plasterboard on dabs
Plaster skim
U-Value = 0.18W/m²K

Dormer cheeks:

Plywood
100mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) between studs
50mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) over studs
Plasterboard
Plaster skim
U-Value = 0.16W/m²K

Stud walls to room in roof:

100mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) between studs
50mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) over studs
Plasterboard
Plaster skim
U-Value = 0.16W/m²K

Rooflight upstands:

Plywood
100mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) between studs
50mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) over studs
Plasterboard
Plaster skim
U-Value = 0.16W/m²K

Ground floor:

Screed
150mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm)
Plasmor Aglite beam and block or Solid Concrete
U-Value = 0.12W/m²K

Exposed floor:

Chipboard
200mm Mineral Wool K=0.040 between joists
Plasterboard
Plaster skim
U-Value = 0.21W/m²K

Plane roof:

250mm Mineral Wool K=0.040 over joists
200mm Mineral Wool K=0.040 between joists
12.5mm Plasterboard
Plaster skim
U-Value = 0.09W/m²K

Dormer roof:

Plywood
50mm Cavity within joists
100mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) between joists
50mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) below joists
Plasterboard
Plaster skim
U-Value = 0.15W/m²K

Flat roof:

Plywood
100mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm)
Plywood
Joist space
Plasterboard
Plaster skim
U-Value = 0.16W/m²K

Sloped roof:	50mm Cavity within rafter space 100mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) between rafters 50mm Insulation (K=0.022 Kingspan, Celotex, Xtratherm) below rafters Plasterboard Plaster skim <u>U-Value = 0.16W/m²K</u>
Doors:	To achieve <u>U-Value of 1.1W/m²K</u>
Windows:	To achieve <u>U-Value of 1.3W/m²K</u>
Roof windows:	To achieve <u>U-Value of 1.3W/m²K</u>
Heating system:	Air Source Heat Pump to be installed to each plot. <i>Daikin Altherma EDLA09DA3V3 used in the calculations.</i> To underfloor heating and radiators
Heating controls:	Time and Temperature Zone Control
Hot water:	From hot water cylinder Primary pipework insulated. Cylinder stat Water heating timed separately. And to be in heated space
Showers (flow rate):	9 litres/min From combi boiler or unvented cylinder
Secondary heating:	None
Air pressure:	Each plot to achieve a design figure of 4.0m ³ /hm ²
Ventilation:	Natural with extract fans
Efficacy of all fixed lighting:	Minimum 75lm/W
Thermal bridging:	Calculated in SAP 10 based on the use of independently assessed & Plasmor calculated junction details.
Renewables:	None required to meet compliance.
Lintels:	Hi-Therm /thermally broken lintels throughout

Photographic evidence:

Requirement to provide evidence as detailed in Appendix B of Part L 2021

Part O (Overheating):

All dwellings subject to Part L 2021 are required to show compliance to Part O – Overheating. It is likely that the result of this calculation will lead to amendments to window dimensions/ glazing properties which will then need to be fed back into the SAP calculation. Once completed, please send a copy of the overheating calculation and/or updated drawings to allow the amendments to be made.

Summary

The purpose of this report is to demonstrate compliance with Policy 6 by achieving a 10% carbon reduction on the four new dwellings at Warren Road, Ickenham

A reduction exceeding the 10% requirement has been achieved using Air source heat pump technology. This technology does not use gas therefore the carbon emissions produced by the property are far less than that of a conventional gas central heating system.

The fabric of the building has also contributed to the carbon reduction by implementing high performance glazing, a wood burner, a reduced air pressure test figure and by maximizing the amount of insulation wherever feasible within the dwellings.