1-5 Portpool Lane, London Energy Statement

Issue 2 – 10th October 2014

Prepared For: Spot Property LTD



1-5 PORTPOOL LANE, LONDON

ENERGY STATEMENT

Quality Assurance Page

| Issue | Date | Prepared By | Checked By | Approved By | Remarks |
|-------|----------|-------------|------------|-------------|---------------------------------|
| 1 | 07/10/14 | R.Wilkes | M.Smith | M.Taylor | 1773-rw-141007-Energy Statement |
| 2 | 10/10/14 | R.Wilkes | M.Smith | M.Taylor | 1773-rw-141010-Energy Statement |



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Executive Summary 1

This report describes the energy strategy adopted for the proposed residential and office accommodation at 1-5 Portpool Lane in the London Borough of Camden (LBC).

The development comprises six private residential apartments and 331m² of office accommodation (at basement and ground floors).

Energy is an integral part of the development's design, and this report demonstrates how the scheme responds to national, regional and local planning guidance in relation to climate change mitigation.

Carbon Reduction Targets 1.1

London Borough of Camden Sustainability Planning Guidance (CPG 3) dated September 2013 and the London Plan 2011, require that all new developments achieve a minimum 40% improvement in regulated carbon dioxide emissions over the 2010 Building Regulations requirements.

The GLA's Sustainable Design and Construction Supplementary Planning Guidance dated April 2014 confirms that a flat 35% carbon dioxide improvement target (against the 2013 Building Regulations) should be used for both residential and non-residential development to avoid complexity.

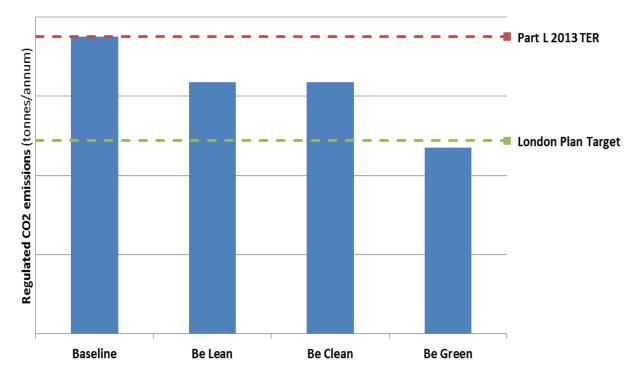
Carbon Reduction Strategy 1.2

The feasibility of achieving these targets has been assessed using the latest version of the Standard Assessment Procedure (SAP) for the residential apartments and the Simplified Building Energy Model (SBEM) for the office accommodation.

The targets will be achieved by following the energy hierarchy, as detailed below;-

- Be Lean Use less energy
- Be Clean Supply energy efficiently
- Be Green Use renewable energy

The graph below details the proposed energy hierarchy for 1-5 Portpool Lane;-



The following table details the carbon dioxide emissions expected at each stage of the energy hierarchy:-

| | Carbon dioxide emissions (Tonnes CO ₂ per annum) | |
|---|---|-------------|
| | Regulated | Unregulated |
| Baseline: Part L 2013 of the Building Regulations Compliant Development | 16.89 | 21.28 |
| After energy demand reduction | 14.31 | 21.28 |
| After CHP | 14.31 | 21.28 |
| After renewable energy | 10.58 | 21.28 |

The following table details the regulated carbon dioxide savings expected to be achieved at each stage of the energy hierarchy;-

| | Regulated carb | on dioxide savings |
|--------------------------------------|---------------------------------------|--------------------|
| | (Tonnes CO ₂ per annum) | (%) |
| Savings from energy demand reduction | 2.58 | 15.3 |
| Savings from CHP | 0.00 | 0.0 |
| Savings from renewable energy | 3.73 | 26.1 |
| Total Cumulative Savings | 6.31 | 37.4 |
| Total Target Savings | 5.9 | 35 |
| Annual Surplus | 0.40 | |

The development is expected to achieve a total saving of 37% in regulated carbon emissions over 2013 Building Regulations.

Passive Design and Energy Efficiency (Be Lean)

The development will demonstrate best practice performance for fabric and engineering services, providing a 15% reduction in regulated carbon dioxide emissions over the Part L 2013 compliance target.

For the residential apartments, the Fabric Efficiency is expected to be 8% better than the Approved Document L1A target rate.

Community Energy and CHP (Be Clean)

The potential for connecting into an existing or planned decentralised energy scheme has been investigated and it is considered that a connection is currently not feasible. There are no existing or planned schemes in the vicinity, and the proposed development is not within an opportunity area.



The proposed scheme is very small with only six apartments and 331m² of office space, and any potential CHP would be very small. A whole life cost appraisal has been carried out and the inclusion of CHP is considered to be unviable for the development.

Renewable Energy Systems (Be Green)

The opportunities for renewable energy systems have been reviewed, and it proposed that photovoltaic and solar thermal panels are installed on the roof of the building. It is planned to provide the following;-

- 46m² of photovoltaic panels (residential and office)
- 4m² of solar thermal panels (office)

As detailed above these provisions are expected to result in a further 22% improvement over Part L, following the passive design and energy efficiency measures.

1.3 Environmental Assessment

A Code for Sustainable Homes rating of 4 is targeted for all of the apartments at 1-5 Portpool Lane. The target rating required to achieve Code Level 4 is 68%.

A Code for Sustainable Homes pre-assessment has been carried out under the November 2010 version and May 2014 Addendum.

The pre-assessment indicates that a score of 70% is achievable, with all mandatory elements required for Code 4 met. Please refer to separate document.



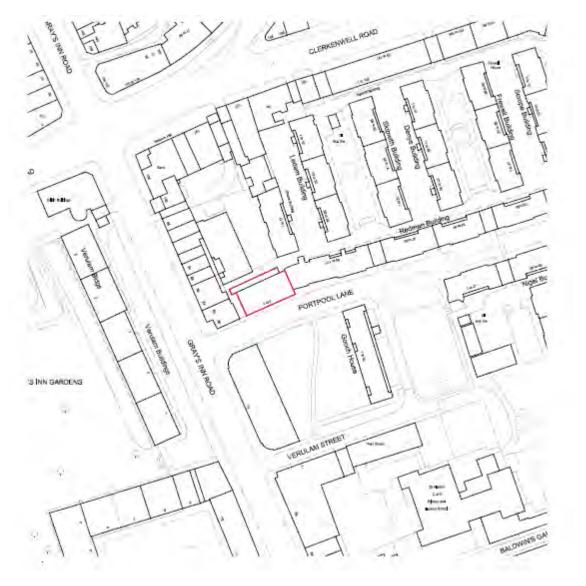
2 Summary of Proposal

The proposal is for a new 5-storey development on Portpool Lane which comprises six private residential apartments and 331m² GIA of office accommodation (at basement and ground floors).

The proposed building matches the footprint of the existing, which is to be demolished.

The 1-5 Portpool Lane site lies within the London Borough of Camden, and is located close to the junction with Gray's Inn Road, as shown on the location plan below.

The site is situated within a well-established mixed use area with mainly commercial properties along Gray's Inn Road and predominantly residential accommodation to Portpool Lane.





1-5 Portpool Lane, London Energy Statement

3 Energy Strategy

The energy strategy follows the principles of the energy hierarchy;-

- Be Lean Use less energy
- Be Clean Supply energy efficiently
- Be Green Use renewable energy

Part L1A SAP modelling has been undertaken for all six residential apartments using Stroma FSAP 2012 software. Part L2A SBEM modelling has been undertaken for the office area using IES Virtual Environment software.

The results of the modelling have been used to inform the energy demand assessment for the development, as detailed below.

3.1 Be Lean - Passive Design and Energy Efficiency

The development will demonstrate best practice performance for fabric and engineering services, providing a 15% reduction in regulated carbon dioxide emissions over the Part L 2013 compliance target.

This reduction will be achieved by a combination of the measures, including the following;

Fabric 'U' Values

The thermal performance of the building fabric will be significantly improved over Part L minimum requirements;-

| External Walls | 0.15 W/m ² K |
|----------------------|-------------------------|
| Floor | 0.18 W/m ² K |
| Roof | 0.18 W/m ² K |
| Glazing | 1.4 W/m ² K |
| Glazing (Fire rated) | 2.4 W/m ² K |

Air Permeability

The target air permeability for the building will be $3 \text{ m}^3/(\text{h m}^2)$ at 50 Pa as compared to the Part L minimum requirement of $10 \text{ m}^3/(\text{h m}^2)$.

Glazing Optimisation

The size, location and g-value of the glazing has been assessed to provide a balance between minimising heat gain and maximising natural daylight (to reduce lighting energy).

The design includes a total glazing area of around 20% of the external wall area, with a g-value of 0.63.

High Efficiency Heating and Cooling Systems

Gas fired condensing combi boilers are proposed to provide space heating and domestic hot water for the residential apartments, which provide an efficiency of 89% (SEDBUK 2009). Domestic hot water system losses are minimised as a storage cylinder is not required.

Air cooled chillers are proposed to provide comfort cooling for the residential apartments which provide an efficiency of 3.01, as compared to the Part L minimum requirement of 2.4.

VRV heat pumps are proposed to provide space heating and cooling for the office areas which provide an efficiency of 4.12 in heating mode and 3.86 in cooling mode, as compared to the Part L minimum requirements of 2.5 (heating) and 2.6 (cooling).

Mechanical Ventilation Systems

Ventilation to the residential apartments will be provided by Mechanical Ventilation with Heat Recovery (MVHR) units.

Mechanical ventilation to the office areas will be provided with heat recovery and will have a Specific Fan Power (SFP) of 0.8 W/(I/s) as compared to the Part L minimum requirement of 1.6 W/(I/s).

Low Energy Lighting

Low energy lighting will be used throughout the development.

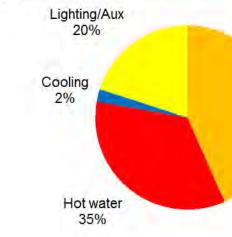
3.2 Energy Demand and CO2 Emissions ('Lean' Scheme)

Energy Demand

The energy demand for the development has been assessed using SAP and SBEM modelling, and the results are as below (before the inclusion of low/zero carbon energy sources);-

| Space Use | Area | Energy for space heating | Energy for domestic hot water | Energy for space cooling | Energy for lighting/auxillary | Unregulated energy |
|-------------|------|--------------------------|-------------------------------------|--------------------------|----------------------------------|--------------------|
| | (m²) | (kWh/year) | (kWh/year) | (kWh/year) | (kWh/year) | (kWh/year) |
| Residential | 514 | 17,956 | 14,442 | 292 | 4,082 | 26,597 |
| Office | 343 | 2,188 | 1,541 | 738 | 5,217 | 18,517 |
| Total | 857 | 20,144 | 15,983 | 1,029 | 9,299 | 45,113 |

Estimated energy consumption breakdown by energy use (regulated energy uses, before the inclusion of low/zero carbon energy sources)



Carbon Emissions

The carbon emissions for the development have been assessed as below (before the inclusion of low/zero carbon energy sources);-

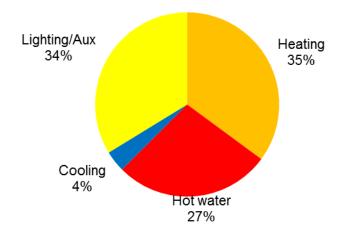


Heating 43%

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| Space Use | CO ₂ emissions for space heating | CO ₂ emissions for domestic hot water | CO ₂ emissions for space cooling | CO ₂ emissions for lighting/auxillary | CO ₂ emissions for unregulated energy uses |
|-------------|---|--|---|--|---|
| | (kg CO ₂ /year) | (kg CO ₂ /year) | (kg CO ₂ /year) | (kg CO ₂ /year) | (kg CO ₂ /year) |
| Residential | 3,878 | 3,119 | 151 | 2,119 | 11,702 |
| Office | 1,131 | 797 | 381 | 2,697 | 9,573 |
| Total | 5,010 | 3,916 | 533 | 4,816 | 21,275 |

Estimated CO2 emissions by energy use (regulated energy uses, before the inclusion of low/zero carbon energy sources)



3.3 Be Clean – Community Energy and CHP

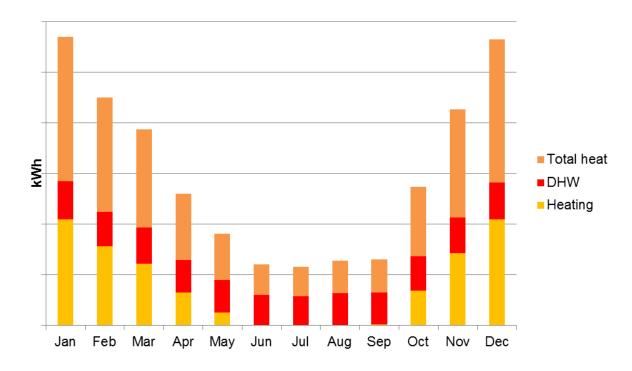
Combined Heat and Power (CHP)

The proposed scheme is very small with only six apartments and 331m² of office space, and the feasibility of the inclusion of CHP in the scheme has been assessed.

The energy required for space heating and domestic hot water has been calculated, and a load profile developed for the scheme, as shown below. From this load profile it has been determined that the optimum size of CHP would be 8kW (thermal) running between 5 and 23 hours per day to meet 100% of the heating and domestic hot water load (with appropriate thermal storage).

The estimated outputs from this CHP would be as below;-

| CHP Unit | Annual running hours | Annual thermal output | Annual electrical output | Annual CO ₂ savings | Annual CO ₂ reduction from energy efficient scheme |
|-------------|----------------------------|-----------------------------|--------------------------------|--------------------------------|---|
| | (hours/year) | (kWh/year) | (kWh/year) | (Tonnes CO2 per year) | (%) |
| 8kWt, 4 kWe | 4516 | 36126 | 18063 | 2.73 | 19.1 |



Thirty year whole life cost appraisals have been carried out to compare the following schemes;-

- DX system to provide comfort cooling to the offices. 2 kWp of PVs.
- to provide heating and cooling to the office area. 7 kWp of PVs and 4m² of solar thermal.

A 4% discount rate has been used in the assessments. The whole life costs are as detailed below;-

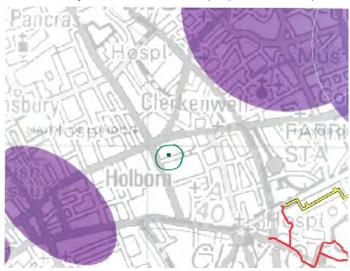
- CHP scheme £230,419
- Non CHP scheme £195,051

As a result of these appraisals a CHP is considered unviable for the development.

Community Energy

The potential for connecting into an existing or planned decentralised energy scheme has been investigated and it is considered that a connection is currently not feasible.

As can be seen from the extract of the London Heat Map below, there are no existing or planned schemes in the vicinity of the site, and the proposed development is not within an opportunity area.





• Central heating and domestic hot water plant (with CHP) serving the residential and office areas.

• Individual combi boilers in each apartment to provide heating and domestic hot water. VRV system

3.4 Be Green – Renewable Energy

This section provides an appraisal of the renewable technologies that can be considered for the proposed development.

An appraisal of potential renewable technologies has been undertaken, the results of which are summarised in the table below.

Technologies such as anaerobic digestion or biomass CHP have been discounted owing to the inappropriate scale of these systems.

| Description | Feasible | Output | Notes |
|--|----------|--|---|
| Photovoltaic electricity generation Photovoltaic modules use the photovoltaic effect to generate electricity directly from sunlight. | | 46m2 9kWh peak 7090kWh/year 3.73 Tonnes CO2 per year saving 26% reduction | This is the preferred option for the development, as it provides the greatest carbon savings. Roof space has been identified. |
| Solar water heating Solar water heating systems use energy from the sun to pre-heat domestic hot water. Solar water heating systems are generally composed of solar thermal collectors and a fluid system to move the heat from the collector to a storage tank in order to store the heat for subsequent use. | | 4m2 70kWh/year 0.7% reduction | Solar thermal is feasible for the office hot water as CHP is not included, but limited space is available at roof level with PV's, so a small area is proposed. |
| Ground Source Heat Pump Ground source heat pumps can be used to extract heat from the ground by circulating a fluid through a system of pipes to a heat exchanger which transfers the energy to the distribution network. They have the advantage that they can act as a source of both heating and cooling for buildings. Ground source heat pumps are either open-loop (extracting and rejecting water to the aquifer below the site) or closed- loop. | * | N/A | Due to the lack of external space for the boreholes an open loop system could not be incorporated, Capacity from closed loop limited by small site area. System not proposed. |
| Biomass Heating Biomass heating systems combust biomass material in a biomass boiler in order to heat water in the same way that gas boilers combust gas. Biomass heating approaches a carbon neutral process. Biomass boilers require storage adjacent to the boiler to be provided. The fuel is then delivered on a regular basis. | * | N/A | Biomass would have significant maintenance, logistics (fuel delivery), and air quality implications in this central London location. System not proposed. |

Wind power

Wind turbines use the wind's forces to turn a rotor which generates electricity. Wind power is used in large scale wind farms for national electrical grids as well as in small



| N/A | This system would not be expected to lead to significant CO2 savings due to wind |
|-----|--|
| | patterns in urban areas System not proposed. |

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Appendix A – SAP Calculations





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| Project Informatio | n: | | | |
|----------------------|---------------------|---------------------------------|--|--------------------------|
| Assessed By: | Paul Bainbridge (| (STRO006208) | Building Type: | Flat |
| Dwelling Details: | | | | |
| NEW DWELLING | DESIGN STAGE | | Total Floor Area: 65 | 5.51m² |
| Site Reference : | New Project | | Plot Reference: | Flat 001 - Rev F - No PV |
| Address : | Flat 001 | | | |
| Client Details: | | | | |
| Name: | | | | |
| Address : | | | | |
| This report covers | s items included v | within the SAP calculations. | | |
| | | tions compliance. | | |
| 1a TER and DER | | | | |
| Fuel for main heati | ng system: Mains g | jas | | |
| Fuel factor: 1.00 (n | | | | |
| - | xide Emission Rate | | 21.28 kg/m ² | |
| - | ioxide Emission Ra | ate (DER) | 19.98 kg/m² | ОК |
| 1b TFEE and DFI | | E) | 50.40 MMb/m2 | |
| - | gy Efficiency (TFE | | 59.10 kWh/m ² 52.60 kWh/m ² | |
| Dweiling Fabric En | ergy Efficiency (DF | EC) | 52.00 KW0///11* | ок |
| 2 Fabric U-values | 8 | | | |
| Element | | Average | Highest | |
| External w | vall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | OK |
| Party wall | | 0.00 (max. 0.20) | - | OK |
| Floor | | 0.18 (max. 0.25) | 0.18 (max. 0.70) | OK |
| Roof | | (no roof) | | |
| Openings | | 1.64 (max. 2.00) | 2.40 (max. 3.30) | ОК |
| 2a Thermal bridg | | | | |
| 3 Air permeabilit | | from linear thermal transmittan | ces for each junction | |
| | ility at 50 pascals | | 3.00 (design valu | (a) |
| Maximum | nity at 50 pascals | | 10.0 | ок |
| 4 Heating efficie | ncv | | | |
| Main Heatin | | Boiler systems with radiator | rs or underfloor heating - ma | ins das |
| and an ended | 5 - 10 - 01 - 01 | Data from manufacturer | e et anderneer nedang - ma | |
| | | Combi boiler | | |
| | | Efficiency 89.0 % SEDBUK | 2009 | |
| | | Minimum 88.0 % | | ОК |
| Secondary h | neating system: | None | | |
| 5 Cylinder insula | tion | | | |
| Hot water St | | No cylinder | | |
| Hot water of | longo. | No cynnoor | | |

N/A

Regulations Compliance Report

| | Space heating controls Hot water controls: | TTZC by plumbing and el No cylinder | ectrical services | ок |
|-------|---|--|------------------------------|----|
| | Boiler interlock: | Yes | | ок |
| | v energy lights | | | |
| | Percentage of fixed lights wit | h low-energy fittings | 100.0% | |
| | Minimum | | 75.0% | ок |
| | chanical ventilation | | | |
| | Continuous supply and extra | ct system | | |
| | Specific fan power: | | 0.47 | |
| | Maximum | | 1.5 | OK |
| I | MVHR efficiency: | | 93% | |
| | Minimum | | 70% | ок |
| 9 Sun | nmertime temperature | | | |
| | Overheating risk (Thames va | lley): | | OK |
| Based | on: | | | |
| | Overshading: | | Average or unknown | |
| | Windows facing: North | | 8.1m², | |
| | Windows facing: East | | 1.08m², | |
| | Windows facing: South | | 5.28m², | |
| | Windows facing: West | | 2.68m², | |
| | Ventilation rate: | | 0.10 | |
| 1 | Blinds/curtains: | | Dark-coloured venetian blind | l |
| | | | Closed 0% of daylight hours | |
| 10 Ke | y features | | | |
| | Air permeablility | | 3.0 m³/m²h | |
| | Doors U-value | | 1.1 W/m²K | |
| | External Walls U-value | | 0.13 W/m ² K | |
| | Fixed cooling system | | 0.10 1.111 | |



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| saesaed By: F | aul Bainbridge (STF | 200062085 | Building Type: | Flat | |
|--|--|--|--------------------------|------------------|----|
| | aarbanninge (om | (0000200) | building type. |) iei | |
| Dwelling Details: | | | Table Class Assar | | |
| NEW DWELLING DE | | | Total Floor Area: 6 | | |
| | lew Project | | Plot Reference: | Flat 001 - Rev F | |
| Address : F | lat 001 | | | | |
| Cileni Delaka | | | | | |
| Name: Address : | | | | | |
| This report covers if t is not a complete i | | in the SAP calculations. is compliance. | | | |
| 1a TER and DER | States of the local division in which the local division in the lo | a car a fair and | | | |
| uel for main heating | system: Mains gas | | | | |
| uel factor: 1.00 (mai | | | | | |
| arget Carbon Dioxid | | | 21.28 kg/m² | | |
| Welling Carbon Diox | | DER) | 12.32 kg/m ⁻ | | OK |
| In TFEE and DFEE | | | | | |
| arget Fabric Energy | | | 59.10 kWh/mP | | |
| weiling Fabric Energ | gy Emclency (DFEE) | | 51.90 KWh/m [#] | | ок |
| 2 Fabric U-vaines | | | | | Un |
| Element | | Average | Highest | | |
| External wal | | 0.15 (max. 0.30) | 0.15 (max. 0.70) | | OK |
| Party wall | | 0.00 (max, 0.20) | - | | OK |
| FIDOF | | 0.18 (max. 0.25) | 0.18 (max. 0.70) | | OK |
| Roof | | (no roof) | | | |
| Openings | | 1.64 (max. 2.00) | 2.40 (max. 3.30) | | OK |
| 2a Thermal bridgin | g - | | A COMPANY OF THE | | |
| | iging calculated from | linear thermal transmittances for | reach junction | | _ |
| 3 All permeability | | The second second second second second | | - | |
| Air permeabilit Maximum | y at 50 pascals | | 3.00 (design val 10.0 | ue) | ок |
| 4 Reading efficiency | (| | | | |
| Main Heating s | , C | Boller systems with radiators or u Data from manufacturer Combi boller Efficiency 89.0 % SEDBUK2009 Alnimum 88.0 % | nderfloor heating - m | ains gas | ок |
| Secondary hea | ating system: | lone | | | |
| 5 Cylindar Insuletto | | | | | |
| | age: t | lo cylinder | | | |

Regulations Compliance Report

| 6 Cuntrola | | | |
|---|--|---|-----|
| Space heating controls Hot water controls: | TTZC by plumbing and el No cylinder | lectrical services | OK |
| Boller Interlock: | Yes | | OK |
| Low energy lights | | | - |
| Percentage of fixed lights with | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| i Mechanical ventilation | the second s | | |
| Continuous supply and extra | ict system | | |
| Specific fan power: | Color Color | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| Summartime tamperature | | | |
| Overheating risk (Thames va | alley): | | .OP |
| ased on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 8.1m ² . | |
| Windows facing: East | | 1.06m², | |
| Windows facing: South | | 5.28m², | |
| Windows facing: West | | 2.68m², | |
| Ventilation rate: | | 3.00 | |
| Blinds/curtains: | | Dark-coloured venetian blind Closed 0% of daylight hours | |
| 10 Key features | | 100000 | |
| Air permeability | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ⁼ K | |
| External Walls U-value Photovoltaic array | | 0.13 W/m=K | |
| | | | |

Stroma FSAP 2012 Vension, 1.0.0.30 (SAP 9.91) - http://www.stroma.com

Fixed cooling system

MEIN-ARDT

Page 2 d 2

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| Project Information: | | | |
|--|--------------------------------------|--------------------------------------|--------------------------|
| Assessed By: Paul Bainbridge | (STRO006208) | Building Type: | Flat |
| Dwelling Details: | | | |
| IEW DWELLING DESIGN STAGE | | Total Floor Area: 96. | 4m² |
| Site Reference : New Project | | Plot Reference: | Flat 002 - Rev D - No PV |
| Address : Flat 002 | | | |
| Client Details: | | | |
| lame: | | | |
| ddress : | | | |
| his report covers items included | | | |
| is not a complete report of regula | ations compliance. | | |
| 1a TER and DER | | | |
| uel for main heating system: Mains uel factor: 1.00 (mains gas) | gas | | |
| Farget Carbon Dioxide Emission Rate | e (TER) | 18.79 kg/m ² | |
| Welling Carbon Dioxide Emission R | | 17.53 kg/m ² | ОК |
| 1b TFEE and DFEE | | in loo kighti | - |
| arget Fabric Energy Efficiency (TFE | E) | 57.10 kWh/m ² | |
| welling Fabric Energy Efficiency (DI | FEE) | 50.50 kWh/m ² | |
| | | | OK |
| 2 Fabric U-values | | | |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | OK |
| Party wall | 0.00 (max. 0.20) | - | OK |
| Floor Roof | 0.18 (max. 0.25) 0.18 (max. 0.20) | 0.18 (max. 0.70) 0.18 (max. 0.35) | OK OK |
| Openings | 1.78 (max. 2.00) | 2.40 (max. 3.30) | OK |
| 2a Thermal bridging | 1.10 (max. 2.00) | 2.10 (max. 0.00) | UK |
| | from linear thermal transmittan | ces for each junction | |
| 3 Air permeability | | | |
| Air permeability at 50 pascals | | 3.00 (design value | :) |
| Maximum | | 10.0 | OK |
| 4 Heating efficiency | | | |
| Main Heating system: | Boiler systems with radiator | rs or underfloor heating - mair | is gas |
| | Data from manufacturer | - | |
| | Combi boiler | | |
| | Efficiency 89.0 % SEDBUK | 2009 | |
| | Minimum 88.0 % | | OK |
| Secondary heating system: | None | | |
| 5 Cylinder insulation | | | |
| Hot water Storage: | No cylinder | | |
| | , | | N/A |
| | | | |

Regulations Compliance Report

| Controls | | | |
|-------------------------------|-------------------------|--------------------------------------|----|
| Space heating controls | TTZC by plumbing and el | lectrical services | ок |
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | OK |
| Low energy lights | | | |
| Percentage of fixed lights wi | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| Mechanical ventilation | | | |
| Continuous supply and extra | act system | | |
| Specific fan power: | - | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| Summertime temperature | | | |
| Overheating risk (Thames va | alley): | | ок |
| ased on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 7.97m², | |
| Windows facing: East | | 3.55m², | |
| Windows facing: South | | 9.36m², | |
| Ventilation rate: | | 0.10 | |
| Blinds/curtains: | | Dark-coloured venetian blind | |
| | | Closed 0% of daylight hours | |
| 0 Key features | | | |
| Air permeablility | | 3.0 m ³ /m ² h | |
| Dears II weber | | 4 4 14//212 | |

Doors U-value External Walls U-value Fixed cooling system

Stroma FSAP 2012 Version: 1.0.0.30 (SAP 9.91) - http://www.stroma.com

MEINH/RD

1.1 W/m²K 0.13 W/m²K

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| Project Information: | | | |
|---------------------------------------|---------------------------------|--------------------------------------|-------|
| Assessed By: Paul Bainbridge | (STRO006208) | Building Type: Flat | |
| Dwelling Details: | | | |
| NEW DWELLING DESIGN STAGE | | Total Floor Area: 96.4m ² | |
| Site Reference : New Project | | Plot Reference: Flat 002 - | Rev D |
| Address : Flat 002 | | | |
| Client Details: | | | |
| Name: | | | |
| Address : | | | |
| This report covers items included | within the SAP calculations | | |
| t is not a complete report of regula | | | |
| 1a TER and DER | | | |
| Fuel for main heating system: Mains | nas | | |
| Fuel factor: 1.00 (mains gas) | 2 | | |
| Target Carbon Dioxide Emission Rate | e (TER) | 18.79 kg/m² | |
| Owelling Carbon Dioxide Emission R | ate (DER) | 12.32 kg/m ² | OK |
| 1b TFEE and DFEE | | | |
| Target Fabric Energy Efficiency (TFE | E) | 57.07 kWh/m ² | |
| Owelling Fabric Energy Efficiency (DI | EE) | 50.46 kWh/m ² | |
| | | | ок |
| 2 Fabric U-values | | | |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | OK |
| Party wall | 0.00 (max. 0.20) | - | OK |
| Floor | 0.18 (max. 0.25) | 0.18 (max. 0.70) | OK |
| Roof | 0.18 (max. 0.20) | 0.18 (max. 0.35) | OK |
| Openings | 1.78 (max. 2.00) | 2.40 (max. 3.30) | ок |
| 2a Thermal bridging | | | |
| | from linear thermal transmittan | ces for each junction | |
| 3 Air permeability | | | |
| Air permeability at 50 pascals | | 3.00 (design value) | |
| Maximum | | 10.0 | ок |
| 4 Heating efficiency | | | |
| Main Heating system: | Boiler systems with radiator | rs or underfloor heating - mains gas | |
| | Data from manufacturer | | |
| | Combi boiler | | |
| | Efficiency 89.0 % SEDBUK | 2009 | |
| | Minimum 88.0 % | | ок |
| Secondary heating system: | None | | |
| 5 Cylinder insulation | | | |
| Hot water Storage: | No cylinder | | |
| | | | N/A |
| | | | 10/4 |

Regulations Compliance Report

| TTZC by plumbing and el | ectrical services | OK |
|-------------------------|--------------------------------------|---|
| No cylinder | | |
| Yes | | OK |
| | | |
| h low-energy fittings | 100.0% | |
| | 75.0% | OK |
| | | |
| ct system | | |
| 2 | 0.47 | |
| | 1.5 | OK |
| | 93% | |
| | 70% | OK |
| | | |
| lley): | Medium | OK |
| | | |
| | Average or unknown | |
| | 7.97m², | |
| | 3.55m², | |
| | 9.36m², | |
| | 3.00 | |
| | Dark-coloured venetian blir | nd |
| | Closed 0% of daylight hour | s |
| | | |
| | 3.0 m ³ /m ² h | |
| | | |
| | | |
| | 0.15 Will K | |
| | | |
| | No cylinder | Yes h low-energy fittings 100.0% 75.0% 0.47 1.5 93% 70% Illey): Medium Average or unknown 7.97m ² , 3.55m ² , 9.36m ² , |

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MEIN-ARDT

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| Flat 4m² lat 003 - Rev D - No PV |
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| lat 003 - Rev D - No PV |
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Regulations Compliance Report

| Space heating controls | TTZC by plumbing and e | lectrical services | OK |
|--------------------------------|------------------------|------------------------------|-----|
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | OK |
| 7 Low energy lights | | | |
| Percentage of fixed lights wit | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| 8 Mechanical ventilation | | | |
| Continuous supply and extra | ct system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| 9 Summertime temperature | | | |
| Overheating risk (Thames va | alley): | | OK |
| ased on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 7.97m², | |
| Windows facing: East | | 1.08m², | |
| Windows facing: South | | 6.72m², | |
| Windows facing: West | | 3.65m², | |
| Ventilation rate: | | 0.10 | |
| Blinds/curtains: | | Dark-coloured venetian blind | t i |
| | | Closed 0% of daylight hours | |
| 10 Key features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |

External Walls U-value

Fixed cooling system

MEIN-ARDT

0.13 W/m²K

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| Project Information: | | | |
|---------------------------------------|-----------------------------------|---------------------------------------|-------|
| Assessed By: Paul Bainbridge | (STRO006208) | Building Type: Flat | |
| Dwelling Details: | | | |
| NEW DWELLING DESIGN STAGE | | Total Floor Area: 72.24m ² | |
| Site Reference : New Project | | Plot Reference: Flat 003 - | Rev D |
| Address : Flat 003 | | | |
| Client Details: | | | |
| Name: | | | |
| Address : | | | |
| This report covers items included | within the SAP calculations. | | |
| It is not a complete report of regula | | | |
| 1a TER and DER | · · | | |
| Fuel for main heating system: Mains | 198 | | |
| Fuel factor: 1.00 (mains gas) | 300 | | |
| Target Carbon Dioxide Emission Rate | e (TER) | 18.29 kg/m² | |
| Dwelling Carbon Dioxide Emission Ra | ate (DER) | 10.94 kg/m ² | OK |
| 1b TFEE and DFEE | | | |
| Target Fabric Energy Efficiency (TFE | E) | 46.52 kWh/m ² | |
| Owelling Fabric Energy Efficiency (DR | EE) | 45.34 kWh/m ² | |
| | | | ок |
| 2 Fabric U-values | | | |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | OK |
| Party wall | 0.00 (max. 0.20) | - | OK |
| Floor | (no floor) | | |
| Roof | 0.18 (max. 0.20) | 0.18 (max. 0.35) | OK |
| Openings | 1.68 (max. 2.00) | 2.40 (max. 3.30) | ок |
| 2a Thermal bridging | | | |
| | from linear thermal transmittance | s for each junction | |
| 3 Air permeability | | | |
| Air permeability at 50 pascals | | 3.00 (design value) | |
| Maximum | | 10.0 | ок |
| 4 Heating efficiency | | | |
| Main Heating system: | Boiler systems with radiators of | or underfloor heating - mains gas | |
| | Data from manufacturer | | |
| | Combi boiler | | |
| | Efficiency 89.0 % SEDBUK20 | 09 | |
| | Minimum 88.0 % | | ок |
| Secondary heating system: | None | | |
| | | | |
| 5 Cylinder insulation | | | |
| Hot water Storage: | No cylinder | | |
| | | | N/A |

Regulations Compliance Report

| 6 Controls | | | |
|-------------------------------|------------------------|------------------------------|-----|
| | | | |
| Space heating controls | TTZC by plumbing and e | lectrical services | OK |
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | OK |
| 7 Low energy lights | | | |
| Percentage of fixed lights wi | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| 8 Mechanical ventilation | | | |
| Continuous supply and extra | ict system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| 9 Summertime temperature | | | |
| Overheating risk (Thames va | alley): | Medium | OK |
| ased on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 7.97m*, | |
| Windows facing: East | | 1.08m², | |
| Windows facing: South | | 6.72m², | |
| Windows facing: West | | 3.65m², | |
| Ventilation rate: | | 3.00 | |
| Blinds/curtains: | | Dark-coloured venetian blind | l . |
| | | Closed 0% of daylight hours | |
| 10 Key features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |
| Enternal Maile Handler | | 0.40.10//3// | |

External Walls U-value Photovoltaic array Fixed cooling system

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MEIN-ARDT

0.13 W/m²K

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Regulations Compliance Report

| Space heating controls | TTZC by plumbing and e | lectrical services | OK |
|-------------------------------|------------------------|------------------------------|----|
| Hot water controls: | No cylinder | | 0. |
| Boiler interlock: | Yes | | OK |
| ow energy lights | | | |
| Percentage of fixed lights wi | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| echanical ventilation | | | |
| Continuous supply and extra | ct system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | OF |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OF |
| ummertime temperature | | | |
| Overheating risk (Thames va | alley): | | O |
| ed on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 8.26m*, | |
| Windows facing: South | | 5.28m*, | |
| Windows facing: East | | 3.7m², | |
| Ventilation rate: | | 0.10 | |
| Blinds/curtains: | | Dark-coloured venetian blind | |
| | | Closed 0% of daylight hours | |
| Key features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |
| External Walls U-value | | 0.13 W/m ² K | |
| Fixed cooling system | | | |
| | | | |

| Stroma FSAP 2012 Version: 1.0.0.30 (SAP 9.91) - http://www.stroma.com | Stroma FSAP 2012 Version: | 1.0.0.30 (SAP 9 | .91) - http://www.stroma.com |
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|---|---------------------------|-----------------|------------------------------|

MEIN-MRDT

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| Project Information: | | | |
|-------------------------------------|---------------------------------|---------------------------------------|-------|
| ssessed By: Paul Bainbridge | (STRO006208) | Building Type: Flat | |
| Dwelling Details: | | | |
| EW DWELLING DESIGN STAGE | | Total Floor Area: 76.35m ² | |
| ite Reference : New Project | | Plot Reference: Flat 004 - I | Rev D |
| ddress : Flat 004 | | | |
| Client Details: | | | |
| lame: | | | |
| ddress : | | | |
| his report covers items included | within the SAP calculations. | | |
| is not a complete report of regul | | | |
| 1a TER and DER | | | |
| uel for main heating system: Mains | 0.98 | | |
| uel factor: 1.00 (mains gas) | 300 | | |
| arget Carbon Dioxide Emission Rat | e (TER) | 18.46 kg/m ² | |
| welling Carbon Dioxide Emission R | | 11.04 kg/m ² | ок |
| 1b TFEE and DFEE | | | |
| arget Fabric Energy Efficiency (TFE | E) | 48.79 kWh/m ² | |
| welling Fabric Energy Efficiency (D | | 45.56 kWh/m ² | |
| | | | OK |
| 2 Fabric U-values | | | |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | OK |
| Party wall | 0.00 (max. 0.20) | - | OK |
| Floor | (no floor) | | |
| Roof | 0.18 (max. 0.20) | 0.18 (max. 0.35) | OK |
| Openings | 1.64 (max. 2.00) | 2.40 (max. 3.30) | ок |
| 2a Thermal bridging | | | |
| | from linear thermal transmittan | ces for each junction | |
| 3 Air permeability | | | |
| Air permeability at 50 pascals | | 3.00 (design value) | |
| Maximum | | 10.0 | ок |
| 4 Heating efficiency | | | |
| Main Heating system: | Boiler systems with radiator | rs or underfloor heating - mains gas | |
| 2.1 | Data from manufacturer | 2 2 | |
| | Combi boiler | | |
| | Efficiency 89.0 % SEDBUK | 2009 | |
| | Minimum 88.0 % | | OK |
| | | | |
| Secondary heating system: | None | | |
| 5 Cylinder insulation | | | |
| Hot water Storage: | No cylinder | | |
| | | | N/A |

Regulations Compliance Report

| 6 Controls | | | |
|---------------------------------|-----------------------|------------------------------|----|
| | | | |
| Space heating controls | TTZC by plumbing and | electrical services | ок |
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | OK |
| 7 Low energy lights | | | |
| Percentage of fixed lights with | h low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| 8 Mechanical ventilation | | | |
| Continuous supply and extra | ct system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| 9 Summertime temperature | | | |
| Overheating risk (Thames va | illey): | Medium | OK |
| Based on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 8.26m², | |
| Windows facing: South | | 5.28m², | |
| Windows facing: East | | 3.7m*, | |
| Ventilation rate: | | 3.00 | |
| Blinds/curtains: | | Dark-coloured venetian blind | |
| | | Closed 0% of daylight hours | |
| | | | |
| 10 Key features | | 2.0 | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m²K | |
| External Walls U-value | | 0.13 W/m ² K | |
| Photovoltaic array | | | |
| Fixed cooling system | | | |
| | | | |
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MEINHARDT

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| Assessed By: Paul Bainbridge | e (STRO006208) | Building Type: Maison | ette |
|---|---|---------------------------------------|-----------------|
| Dwelling Details: | | | |
| IEW DWELLING DESIGN STAGE | | Total Floor Area: 96.98m ² | |
| ite Reference : New Project | | Plot Reference: Flat 005 | - Rev D - No PV |
| Address: Flat 005 | | | |
| Client Details: | | | |
| lame: | | | |
| Address : | | | |
| his report covers items included | within the SAP calculations | | |
| t is not a complete report of regul | | | |
| 1a TER and DER | | | |
| uel for main heating system: Mains | aas | | |
| uel factor: 1.00 (mains gas) | - | | |
| arget Carbon Dioxide Emission Ra | te (TER) | 18.99 kg/m ² | |
| welling Carbon Dioxide Emission F | (ate (DER) | 18.20 kg/m ² | ок |
| 1b TFEE and DFEE | | | |
| arget Fabric Energy Efficiency (TF | | 58.40 kWh/m ² | |
| welling Fabric Energy Efficiency (D | FEE) | 54.20 kWh/m ² | |
| | | | ок |
| 2 Fabric U-values | • | | |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | OK |
| Party wall Floor | 0.00 (max. 0.20) | - | OK |
| Roof | (no floor) 0.12 (max. 0.20) | 0.18 (max. 0.35) | ок |
| Openings | 1.63 (max. 2.00) | 2.40 (max. 3.30) | OK |
| 2a Thermal bridging | 1.00 (max. 2.00) | 2.40 (max. 5.50) | ON |
| | d from linear thermal transmittanc | es for each junction | |
| 3 Air permeability | | | |
| Air permeability at 50 pascals | | 3.00 (design value) | |
| Maximum | | 10.0 | ок |
| 4 Heating efficiency | | | |
| | | | |
| | Boiler systems with radiators | s or underfloor heating - mains gas | |
| Main Heating system: | Boiler systems with radiators Data from manufacturer | s or underfloor heating - mains gas | |
| | | s or underfloor heating - mains gas | |
| | Data from manufacturer | | |
| | Data from manufacturer Combi boiler | | ок |
| Main Heating system: | Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2 Minimum 88.0 % | | ок |
| | Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2 | | ок |
| Main Heating system: | Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2 Minimum 88.0 % | | ок |
| Main Heating system: Secondary heating system: | Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2 Minimum 88.0 % | | ок |

Regulations Compliance Report

| ontrols | | | |
|-------------------------------|------------------------|------------------------------|---|
| | | | |
| Space heating controls | TTZC by plumbing and e | ectrical services | 0 |
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | C |
| ow energy lights | | | |
| Percentage of fixed lights wi | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | C |
| lechanical ventilation | | | |
| Continuous supply and extra | ict system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | C |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | C |
| ummertime temperature | | | |
| Overheating risk (Thames va | alley): | | C |
| ed on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 15.13m², | |
| Windows facing: East | | 2.16m², | |
| Windows facing: South | | 8.64m², | |
| Windows facing: West | | 6.77m², | |
| Ventilation rate: | | 0.10 | |
| Blinds/curtains: | | Dark-coloured venetian blind | |
| | | Closed 0% of daylight hours | |
| Key features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |
| Roofs U-value | | 0.1 W/m ² K | |
| External Walls U-value | | 0.13 W/m ² K | |
| Fixed cooling system | | | |

MEIN-ARDT

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| Dwelling Details: Total Floor Area: 96.98m ² EW DWELLING DESIGN STAGE Total Floor Area: 96.98m ² Piot Reference: Flat 005 Details: Piot Reference: ame: ddress : ddress : is not a complete report of regulations compliance. fa TER and DER Uel for main heating system: Mains gas uel for main heating system: Mains gas arget factor. 10.0 (mains gas) arget Carbon Dioxide Emission Rate (DER) 18.99 kg/m ² welling Carbon Dioxide Emission Rate (DER) 18.99 kg/m ² welling Fabric Energy Efficiency (IFEE) 58.42 kWh/m ² welling Fabric Energy Efficiency (IFEE) 58.42 kWh/m ² veltage Highest Element Average Element Average Party wall 0.15 (max. 0.30) 0.15 (max. 0.70) Via Cristic 0.12 (max. 0.20) - Party wall 0.00 (max. 0.20) - Chernal bridging 3.00 (design value) Marine Ibridging calculated from linear thermal transmittances for each junction 5 Air permeability 10.0 OK Heating efficiency Boiler systems with rad | Project Information: | | | |
|--|--------------------------------------|---------------------------------------|--------------------------------|------------------|
| EW DWELLING DESIGN STAGE Total Floor Area: 96.98m ³ Ite Reference: New Project Plot Reference: Flat 005 - Rev D Other Details: Ite and the set of the set o | Assessed By: Paul Bainbridge | (STRO006208) | Building Type: | Maisonette |
| ite Reference : New Project Plot Reference : Flat 005 - Rev D ddress : Flat 005 Send Details ame: ddress : Flat 005 Send Details ame: ddress : his report covers items included within the SAP calculations. is not a complete report of regulations compliance. la TER and DER Lef for main heating system: Mains gas arget Carbon Dioxide Emission Rate (DER) 18.99 kg/m ² welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m ² Welling Carbon Dioxide Emission Rate (DER) 0.15 (max. 0.70) 0 K Party wall 0.00 (max. 0.20) - 0 K Party wall 0.00 (max. 0.20) - 0 K Party wall 0.00 (max. 0.20) 0.18 (max. 0.35) 0 K 20 Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability at 50 pascals 3.00 (design value) 0.0 K Air permeability at 50 pascals 3.00 (design value) 0.0 K Heating efficiency 80.0 % SEDBUK2000 Minimum 88.0 % 0K Secondary heating system: None Efficiency 80.0 % SEDBUK2000 Minimum 88.0 % 0K | Dwelling Details: | | | |
| ddress : Flat D05 Cleant Details: ame: ddress : his report covers items included within the SAP calculations. is not a complete report of regulations compliance. Is TER and DER uel for main heating system: Mains gas uel for main heating system: Mains gas uel for main heating system: Mains gas uel for anin heating system: Mains gas uel factor: 1.00 (mains gas) arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m ³ welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m ³ welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m ³ welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m ³ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ³ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ⁴ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ⁴ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ⁴ welling Carbon Dioxide Emission Rate (DER) 78.42 kWh/m ⁴ welling Carbon (DFEE) 54.16 kWh/m ⁴ Welling Fabric Energy Efficiency (DFEE) 68.42 kWh/m ⁴ Welling Fabric Energy Efficiency (DFEE) 78.42 kWh/m ⁴ Welling Fabric Energy Efficiency (DFEE) 78.42 kWh/m ⁴ Welling Carbon (DFEE) 78.42 kWh/m ⁴ Welling Fabric U-Values 78.42 kWh/m ⁴ Kernerab Didging calculated from linear thermal transmittances for each junction 78.42 kWh/m ⁴ Main Heating system: None Secondary heating system: None | IEW DWELLING DESIGN STAGE | | Total Floor Area: 96 | 6.98m² |
| Cart Details: ame: ddress: his report covers items included within the SAP calculations. is not a complete report of regulations compliance. Ia TER and DER uel for main heating system: Mains gas uel for main heating system: Mains gas uel for main heating system: Mains gas uel forton: 1.00 (mains gas) arget Carbon Dixide Emission Rate (TER) 18.99 kg/m² welling Carbon Dixide Emission Rate (DER) 13.02 kg/m² arget Fabric Energy Efficiency (TFEE) 58.42 kWh/m² welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² Verates 0K Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Party wall 0.00 (max. 0.20) - OK Party wall 0.10 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK Air permeability at 50 pascals 3.00 (design value) Main Heating system: Boiler systems with radiators or underfloor heating - mains gas <t< td=""><td>Site Reference : New Project</td><td></td><td>Plot Reference:</td><td>Flat 005 - Rev D</td></t<> | Site Reference : New Project | | Plot Reference: | Flat 005 - Rev D |
| ame: ddress : his report covers items included within the SAP calculations. is not a complete report of regulations compliance. I 51 FR and DER Uel for main heating system: Mains gas uel factor: 1.00 (mains gas) arget Carbon Dioxide Emission Rate (DER) 18.99 kg/m² welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Welling Fabric Energy Efficiency (TFEE) 58.42 kWh/m² Welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² V 2 Fabric U-values Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) 0K Party wall 0.00 (max. 0.20) - OK Porings 1.63 (max. 2.00) 2.40 (max. 0.35) 0K Openings 1.63 (max. 2.00) 2.40 (max. 3.30) 0K 2 a Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability Air permeability Air permeability at 50 pascals 0.30 % SEDBUK 2009 Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 69.0 % SEDBUK 2009 Minimum 88.0 % 0K | Address : Flat 005 | | | |
| ddress : his report covers items included within the SAP calculations. is not a complete report of regulations compliance. la TER and DER uel for main heating system: Mains gas uel factor: 1.00 (mains gas) arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m ³ welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m ³ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ³ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ³ welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m ³ welling Fabric Energy Efficiency (DFEE) 58.42 kWh/m ³ welling Fabric Energy Efficiency (DFEE) 58.42 kWh/m ³ welling Fabric Energy Efficiency (DFEE) 58.416 kWh/m ³ welling Fabric Energy Efficiency (DFEE) 76.416 kWh/m ³ welling Fabric Uncent 76.416 kWh/m ³ welling Fabric Unc | Client Details: | | | |
| his report covers items included within the SAP calculations. is not a complete report of regulations compliance. In TER and DER Uel for main heating system: Mains gas uel factor: 1.00 (mains gas) arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m² welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m² Welling Fabric Energy Efficiency (TFEE) 58.42 kWh/m² Welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² Veltare the transmitter of t | lame: | | | |
| is not a complete report of regulations compliance. In TER and DER Uel for main heating system: Mains gas arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m² welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² welling Carbon Dioxide Emission Rate (DER) 58.42 kWh/m² arget Fabric Energy Efficiency (TFEE) 58.42 kWh/m² welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² C Fabric U-values E lement Average Highest E termal wall 0.15 (max. 0.30) 0.15 (max. 0.70) 0K Party wall 0.00 (max. 0.20) - 0K Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) 0K Openings 1.63 (max. 2.00) 2.40 (max. 3.30) 0K 2 Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability at 50 pascals 3.00 (design value) 10.0 0K 4 Heating efficiency Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK 2009 Minimum 88.0 % 0K 5 Cylinder insulation Hot water Storage: No cylinder | Address: | | | |
| In the start of the start o | his report covers items included | within the SAP calculations. | | |
| lel for main heating system: Mains gas uel factor: 1.00 (mains gas) arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m² welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Velling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Welling Fabric Energy Efficiency (TFEE) 58.42 kWh/m² welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² Velling Carbon Dioxide Mains gas Velling Carbon Dioxide Mains gas Velling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² Welling Carbon Dioxide Emission Rate (DER) 54.42 kWh/m² Velling Carbon Dioxide Emission Rate (DER) 54.42 kWh/m² Velling Carbon Dioxide Emission Rate (DER) 54.416 kWh/m² Velling Carbon Dioxide Emission Rate (DER) 754.416 kWh/m² Velling Carbon Dioxide Mains 2.00 0.15 (max. 0.70) 0K Party wall 0.15 (max. 0.30) 0.15 (max. 0.70) 0K Party wall 0.12 (max. 0.20) 0.18 (max. 0.35) 0K Openings 1.63 (max. 2.00) 2.40 (max. 3.30) 0K 24 Thermal Diridging Thermal Diridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability at 50 pascals 3.00 (design value) 10.0 0K 4 Heating efficiency Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % 0K Secondary heating system: None | is not a complete report of regula | ations compliance. | | |
| leel factor: 1.00 (mains gas) arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m² welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² oK b TFEE and DFEE arget Fabric Energy Efficiency (TFEE) 58.42 kWh/m² welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² C Fabric U-values Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2 a Thermal bridging Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability at 50 pascals 0.00 (design value) Maximum 0.00 % SEDBUK2009 Minimum 88.0 % OK Secondary heating system: None 5 Cylinder insulation Hot water Storage: No cylinder | 1a TER and DER | | | |
| arget Carbon Dioxide Emission Rate (TER) 18.99 kg/m² OK welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² OK Ib TFEE and DFEE arget Fabric Energy Efficiency (TFEE) 58.42 kWh/m² welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m² Vertice Element Average Highest OK E termal wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 24 Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability at 50 pascals 3.00 (design value) Maximum 0.00 (max 8.0 % SEDBUK2009 Minimum 88.0 % SEDBUK2009 Minimum 88.0 % SEDBUK2009 Minimum 88.0 % OK | uel for main heating system: Mains | gas | | |
| welling Carbon Dioxide Emission Rate (DER) 13.02 kg/m² OK th TFEE and DFEE arget Fabric Energy Efficiency (TFEE) 58.42 kWh/m² welling Fabric Energy Efficiency (DFEE) 58.42 kWh/m² V 2 Fabric U-values V 2 Fabric U-values V 2 Fabric U-values 0.05 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2 A Thermal bridging Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability at 50 pascals 3.00 (design value) Maximum 0.00 (Max 8.0 (design value) 0.0 (Max 8.0 (design value)) Maximum 0.00 (Max 8.0 (design value) 0.0 (Max 8.0 (design value)) Air permeability at 50 pascals 0.0 (design value) 0.0 (Max 8.0 (design value)) Maximum 0.0 (Max 8.0 (design value) 0.0 (Max 8.0 (design value)) 0.0 (Max 8.0 (design va | uel factor: 1.00 (mains gas) | | | |
| Ib TFEE and DFEE arget Fabric Energy Efficiency (TFEE) welling Fabric Energy Efficiency (DFEE) 58.42 kWh/m ² OK 2 Fabric U-values Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability at 50 pascals 3.00 (design value) Maximum Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % OK Secondary heating system: None | | | - | |
| arget Fabric Energy Efficiency (TFEE) 58.42 kWh/m ³ welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m ² CK 2 Fabric U-values Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability at 50 pascals 3.00 (design value) Maximum 10.0 OK 4 Heating efficiency Main Heating system: Boller systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boller Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % OK | - | ate (DER) | 13.02 kg/m ² | ОК |
| welling Fabric Energy Efficiency (DFEE) 54.16 kWh/m ² Flement Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) - OK Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging calculated form linear thermal transmittances for each junction OK 3 Air permeability at 50 pascals 3.00 (design value) OK Maximum 10.0 OK 4 Heating efficiency Jata from manufacturer Combi boiler Combi boiler Efficiency 89.0 % SEDBUK2009 OK Minimum 88.0 % OK OK | | | | |
| OK OK 2 Fabric U-values Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) OK OK Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability 3.00 (design value) 0K Maximum 10.0 OK 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler OK Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % OK Secondary heating system: None OK | | | | |
| 2 Fabric U-values Element Average Highest External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) - OK Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging Calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability at 50 pascals 3.00 (design value) 0K Maximum 10.0 OK 0K 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas 0ata from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK 5 Cylinder insulation No cylinder U | welling Fabric Energy Efficiency (Dr | ·EE) | 54.16 KWh/m* | OK |
| External wall 0.15 (max. 0.30) 0.15 (max. 0.70) OK Party wall 0.00 (max. 0.20) - OK Floor (no floor) OK OK Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging Thermal bridging calculated from linear thermal transmittances for each junction OK 3 Air permeability Air permeability at 50 pascals 3.00 (design value) OK Maximum 10.0 OK OK 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK 5 Cylinder insulation No cylinder Vinger | 2 Fabric U-values | | | OK |
| Party wall0.00 (max. 0.20)-OKFloor(no floor)(no floor)(No floor)(No floor)Roof0.12 (max. 0.20)0.18 (max. 0.35)OKOpenings1.63 (max. 2.00)2.40 (max. 3.30)OKCarthermal bridgingThermal bridging calculated from linear thermal transmittances for each junction3 Air permeabilityAir permeability at 50 pascals3.00 (design value) 10.0Maximum10.0OKCombine systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 %OKSecondary heating system:NoneSecondary heating system:None | Element | Average | Highest | |
| Floor (no floor) Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging calculated from linear thermal transmittances for each junction OK 3 Air permeability Afr permeability at 50 pascals 3.00 (design value) OK Maximum 10.0 OK 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK 5 Cylinder insulation No cylinder U | External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | ОК |
| Roof 0.12 (max. 0.20) 0.18 (max. 0.35) OK Openings 1.63 (max. 2.00) 2.40 (max. 3.30) OK 2a Thermal bridging calculated from linear thermal transmittances for each junction OK 3 Air permeability Air permeability at 50 pascals 3.00 (design value) OK Maximum 10.0 OK 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK 5 Cylinder insulation Hot water Storage: No cylinder | Party wall | 0.00 (max. 0.20) | - | OK |
| Openings1.63 (max. 2.00)2.40 (max. 3.30)OKCa Thermal bridgingCalculated from linear thermal transmittances for each junctionOpeningOpening3 Air permeability3.00 (design value) 10.0OK4 Heating efficiency3.00 (design value) 10.0OK4 Heating system:Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 %OK5 Cylinder insulationNoneImage: Secondary heating system:None | Floor | · · · · · · · · · · · · · · · · · · · | | |
| 2a Thermal bridging Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability 3.00 (design value) Air permeability at 50 pascals 3.00 (design value) Maximum 10.0 OK 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas Oata from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK 4 Hot water Storage: No cylinder OK | | | | |
| Thermal bridging calculated from linear thermal transmittances for each junction 3 Air permeability Air permeability at 50 pascals 3.00 (design value) Maximum 10.0 OK Heating efficiency Main Heating system: Boiler systems with radiators or underfloor heating - mains gas OK Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK Hot water Storage: | | 1.63 (max. 2.00) | 2.40 (max. 3.30) | ок |
| 3 Air permeability Air permeability at 50 pascals 3.00 (design value) OK Maximum 10.0 OK 4 Heating efficiency Boiler systems with radiators or underfloor heating - mains gas Oata from manufacturer Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Oata from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK 6 Cylinder insulation Hot water Storage: No cylinder | | | | |
| Air permeability at 50 pascals Maximum 3.00 (design value) 10.0 OK I Heating efficiency IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII | | from linear thermal transmittan | ices for each junction | |
| Maximum 10.0 OK Image: Heating efficiency Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % OK Secondary heating system: None OK Image: Secondary heating system: None None | | | 3.00 (design valu | e) |
| Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % OK Secondary heating system: None Secondary heating system: None Main Heating system: None | | | | |
| Main Heating system: Boiler systems with radiators or underfloor heating - mains gas Data from manufacturer Combi boiler Efficiency 89.0 % SEDBUK2009 Minimum 88.0 % OK Secondary heating system: None Secondary heating system: None Main Heating system: None | 4 Heating efficiency | | | |
| Combi boiler Efficiency 89.0 % SEDBUK2009 OK Secondary heating system: None OK Secondary heating system: None None Secondary heating system: None None Secondary heating system: None None | | - | rs or underfloor heating - mai | ins gas |
| Minimum 88.0 % OK Secondary heating system: None Cylinder insulation Hot water Storage: No cylinder | | | | |
| Secondary heating system: None 5 Cylinder insulation Hot water Storage: No cylinder | | Efficiency 89.0 % SEDBUK | 2009 | |
| 5 Cylinder insulation Hot water Storage: No cylinder | | Minimum 88.0 % | | ок |
| Hot water Storage: No cylinder | Secondary heating system: | None | | |
| | 5 Cylinder insulation | | | |
| N/A | Hot water Storage: | No cylinder | | |
| | | | | N/A |

Regulations Compliance Report

| Controls | | | |
|---|--|----------------------------|----|
| Controls | | | |
| Space heating controls Hot water controls: | TTZC by plumbing and el No cylinder | ectrical services | ок |
| Boiler interlock: | Yes | | ок |
| Low energy lights | | | |
| Percentage of fixed lights with | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | ок |
| Mechanical ventilation | | | |
| Continuous supply and extra | ct system | | |
| Specific fan power: | - | 0.47 | |
| Maximum | | 1.5 | ок |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| Summertime temperature | | | |
| Overheating risk (Thames va | alley): | Medium | OK |
| ased on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 15.13m², | |
| Windows facing: East | | 2.16m*, | |
| Windows facing: South | | 8.64m², | |
| Windows facing: West | | 6.77m*, | |
| Ventilation rate: | | 3.00 | |
| Blinds/curtains: | | Dark-coloured venetian bli | nd |
| | | Closed 0% of daylight hou | rs |
| 0 Key features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |
| Roofs U-value | | 0.1 W/m ² K | |
| External Walls U-value | | 0.13 W/m ² K | |
| | | | |

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Photovoltaic array Fixed cooling system

MEIN-ARDT

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.0.30 Printed on 25 September 2014 at 16:10:14

| Project Information: | | | |
|---|--|--|-------------------|
| ssessed By: Paul Bainbridge (| (STRO006208) | Building Type: Maison | ette |
| Dwelling Details: | | | |
| EW DWELLING DESIGN STAGE | | Total Floor Area: 106.46m ² | |
| ite Reference : New Project | | Plot Reference: Flat 006 | 6 - Rev D - No PV |
| ddress: Flat 006 | | | |
| Client Details: | | | |
| ame: | | | |
| ddress: | | | |
| his report covers items included v | within the SAP calculations. | | |
| is not a complete report of regula | | | |
| 1a TER and DER | - - | | |
| uel for main heating system: Mains (| gas | | |
| uel factor: 1.00 (mains gas) | - | | |
| arget Carbon Dioxide Emission Rate | e (TER) | 18.23 kg/m² | |
| welling Carbon Dioxide Emission Ra | ate (DER) | 17.53 kg/m² | ок |
| 1b TFEE and DFEE | | | |
| arget Fabric Energy Efficiency (TFE | | 57.20 kWh/m ² | |
| welling Fabric Energy Efficiency (DF | EE) | 53.50 kWh/m ² | ок |
| 2 Fabric U-values | | | UK |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | ок |
| Party wall | 0.00 (max. 0.20) | - | ок |
| Floor | (no floor) | | |
| Roof | 0.12 (max. 0.20) | 0.18 (max. 0.35) | OK |
| Openings | 1.72 (max. 2.00) | 2.40 (max. 3.30) | ок |
| 2a Thermal bridging | | | |
| | from linear thermal transmittan | ces for each junction | |
| 3 Air permeability | | | |
| Air permeability at 50 pascals Maximum | | 3.00 (design value) | ок |
| Maximum | | 10.0 | UK |
| 4 Heating efficiency | | | |
| Main Heating system: | - | s or underfloor heating - mains gas | |
| | Data from manufacturer | | |
| | Combi boiler | | |
| | Efficiency 89.0 % SEDBUK Minimum 88.0 % | 2009 | OK |
| | winimum oo.U % | | ок |
| Secondary heating system: | None | | |
| | | | |
| 5 Cylinder insulation | | | |
| | No cylinder | | |

| ontrols | | | |
|---------------------------------|-------------------------|---|----|
| Space heating controls | TTZC by plumbing and el | lectrical services | ок |
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | OK |
| w energy lights | | | |
| Percentage of fixed lights with | th low-energy fittings | 100.0% | |
| Minimum | | 75.0% | OK |
| echanical ventilation | | | |
| Continuous supply and extra | act system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| Immertime temperature | | | |
| Overheating risk (Thames v | alley): | | OK |
| d on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 15.37m², | |
| Windows facing: East | | 6.6m², | |
| Windows facing: South | | 12.48m [*] , | |
| Ventilation rate: | | 0.10 | |
| Blinds/curtains: | | Dark-coloured venetian blind Closed 0% of daylight hours | |
| | | closed 0% of daylight hours | |
| (ey features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |
| Roofs U-value | | 0.1 W/m ² K | |
| External Walls U-value | | 0.13 W/m ² K | |
| Fixed cooling system | | | |
| | | | |
| | | | |
| | | | |
| | | | |
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MEINHARDT

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.1.8 Printed on 26 September 2014 at 11:45:39

| Project Information: | | | |
|--|--|--|-----------|
| Assessed By: Paul Bainbridge | (STRO006208) | Building Type: Maiso | nette |
| Dwelling Details: | | | |
| NEW DWELLING DESIGN STAGE | | Total Floor Area: 106.46m ² | |
| Site Reference : New Project | | Plot Reference: Flat 00 | 6 - Rev D |
| Address : Flat 006 | | | |
| Client Details: | | | |
| Name: | | | |
| Address : | | | |
| This report covers items included | within the SAP calculations. | | |
| t is not a complete report of regula | ations compliance. | | |
| 1a TER and DER | | | |
| uel for main heating system: Mains | gas | | |
| uel factor: 1.00 (mains gas) | | | |
| Target Carbon Dioxide Emission Rate | | 18.23 kg/m ² | |
| Welling Carbon Dioxide Emission Ra 1b TFEE and DFEE | ate (DER) | 12.82 kg/m² | ок |
| arget Fabric Energy Efficiency (TFE | E) | 57.25 kWh/m ² | |
| welling Fabric Energy Efficiency (DF | | 53.54 kWh/m ² | |
| | / | | ок |
| 2 Fabric U-values | | | |
| Element | Average | Highest | |
| External wall | 0.15 (max. 0.30) | 0.15 (max. 0.70) | ок |
| Party wall | 0.00 (max. 0.20) | - | ок |
| Floor | (no floor) | 0.40 (main 0.25) | 014 |
| Roof Openings | 0.12 (max. 0.20) 1.72 (max. 2.00) | 0.18 (max. 0.35) 2.40 (max. 3.30) | OK OK |
| 2a Thermal bridging | 1.72 (max. 2.00) | 2.40 (max. 5.50) | OK |
| | from linear thermal transmittan | ces for each junction | |
| 3 Air permeability | | , | |
| Air permeability at 50 pascals | | 3.00 (design value) | |
| Maximum | | 10.0 | ок |
| 4 Heating efficiency | | | |
| Main Heating system: | Boiler systems with radiato | rs or underfloor heating - mains gas | |
| | Data from manufacturer | | |
| | Combi boiler | | |
| | Efficiency 89.0 % SEDBUK Minimum 88.0 % | 2009 | ок |
| | Willington 00.0 % | | UK |
| Secondary heating system: | None | | |
| 5 Cylinder insulation | | | |
| Hot water Storage: | No cylinder | | |
| not hater eterage. | | | N/A |
| | | | 100 |

Regulations Compliance Report

| Space heating controls | TTZC by plumbing and el | ectrical services | ок |
|--------------------------------|-------------------------|------------------------------|----|
| Hot water controls: | No cylinder | | |
| Boiler interlock: | Yes | | ок |
| Low energy lights | | | |
| Percentage of fixed lights wit | h low-energy fittings | 100.0% | |
| Minimum | | 75.0% | ок |
| Mechanical ventilation | | | |
| Continuous supply and extra | ct system | | |
| Specific fan power: | | 0.47 | |
| Maximum | | 1.5 | OK |
| MVHR efficiency: | | 93% | |
| Minimum | | 70% | OK |
| Summertime temperature | | | |
| Overheating risk (Thames va | lley): | Medium | OK |
| ed on: | | | |
| Overshading: | | Average or unknown | |
| Windows facing: North | | 15.37m², | |
| Windows facing: East | | 6.6m*, | |
| Windows facing: South | | 12.48m², | |
| Ventilation rate: | | 3.00 | |
| Blinds/curtains: | | Dark-coloured venetian blind | |
| | | Closed 0% of daylight hours | |
| Key features | | | |
| Air permeablility | | 3.0 m³/m²h | |
| Doors U-value | | 1.1 W/m ² K | |
| Roofs U-value | | 0.1 W/m ² K | |
| External Walls U-value | | 0.13 W/m ² K | |
| Photovoltaic array | | | |
| Fixed cooling system | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

MEIN-KRDT

1-5 Portpool Lane, London Energy Statement

Appendix B – CHP Whole Life Costing





Whole Life Costs - Central plant with CHP, 4% Discount Rate

| | | | | | | | | | | | | | | | | Years | | | | | | | | | | | | | | | | |
|------------------------------------|---------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------|---------|----------|----------|----------|----------|----------|----------|----------|----------|--|
| Description | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ٩ | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 3(| Notes |
| Capital cost - Heating system | £48,435 | £0 | £0 | £0 | £0 | £C |) £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £ | £5,500 per apartment (not including fit-out) + £45/m² for office (including fit-out) |
| Capital cost - PV panels | £6,000 | £0 | £0 | £0 | £0 | £0 | 0 £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | | £3000/kWp (installed), 2kWp |
| Replacement cost - Heating system | £0 | £0 | £0 | £0 | £0 | £0 |) £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £17,684 | £0 | £0 | £0 | £0 | £5,884 | £0 | £0 | £0 | £0 | £0 | Boilers/CHP/pumps replaced at 20 years, primary heating pipew ork at 25 years, PV panels 25 years |
| Residual value | £0 | £0 | £0 | £0 | £0 | £0 |) £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | -£11,323 | Boilers/CHP/pumps 10 years, primary heating pipew ork 20 years, PV panels 20 years |
| Operation/maintenance - Heating | £0 | £3,296 | £3,169 | £3,047 | £2,930 | £2,818 | £2,709 | £2,605 | £2,505 | £2,408 | £2,316 | £2,227 | £2,141 | £2,059 | £1,980 | £1,903 | £1,830 | £1,760 | £1,692 | £1,627 | £1,564 | £1,504 | £1,446 | £1,391 | £1,337 | £1,286 | £1,236 | £1,189 | £1,143 | £1,099 | £1,057 | £4/m² |
| Gas costs - central heating system | £0 | £1,737 | £1,670 | £1,606 | £1,544 | £1,485 | £1,470 | £1,414 | £1,359 | £1,307 | £1,257 | £1,245 | £1,197 | £1,151 | £1,107 | £1,064 | £1,054 | £1,013 | £974 | £937 | £901 | £892 | £858 | £825 | £793 | £763 | £755 | £726 | £698 | £671 | £646 | Heat output 36126kWh/annum, CHP gas input 72253kWh @ 2.5p/kWh |
| Displaced electricity (CHP) | £0 | -£1,476 | -£1,420 | -£1,365 | -£1,312 | -£1,262 | £1,250 | -£1,202 | -£1,156 | -£1,111 | -£1,068 | -£1,058 | -£1,017 | -£978 | -£941 | -£904 | -£896 | -£861 | -£828 | -£796 | -£766 | -£758 | -£729 | -£701 | -£674 | -£648 | -£642 | -£617 | -£594 | -£571 | -£549 | CHP electrical output 18063kWh/annum @ 8.5p/kWh |
| Displaced electricity (PVs) | £0 | -£166 | -£159 | -£153 | -£147 | -£141 | -£140 | -£135 | -£130 | -£125 | -£120 | -£119 | -£114 | -£110 | -£105 | -£101 | -£100 | -£97 | -£93 | -£89 | -£86 | -£85 | -£82 | -£79 | -£76 | -£73 | -£72 | -£69 | -£67 | -£64 | -£62 | 2025kWh/annum @ 8.5p/kWh |
| Meter reading and billing | £0 | £462 | £444 | £427 | £410 | £395 | £379 | £365 | £351 | £337 | £324 | £312 | £300 | £288 | £277 | £267 | £256 | £246 | £237 | £228 | £219 | £211 | £203 | £195 | £187 | £180 | £173 | £166 | £160 | £154 | £148 | £80/apartment |
| Capital cost - Cooling to offices | £25,725 | £0 | £0 | £0 | £0 | £0 | 0£0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £75/m ² for office (including fit-out) |
| Replacement cost - Office cooling | £0 | £0 | £0 | £0 | £0 | £C | 0£0 | £0 | £0 | £0 | £17,379 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £11,741 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | Cooling system replaced at 10 and 20 years |
| Meter reading and billing | £0 | £154 | £148 | £142 | £137 | £132 | £126 | £122 | £117 | £112 | £108 | £104 | £100 | £96 | £92 | £89 | £85 | £82 | £79 | £76 | £73 | £70 | £68 | £65 | £62 | £60 | £58 | £55 | £53 | £51 | £49 | £80/tenant |
| O Operation/maintenance - Cooling | £0 | £1,979 | £1,903 | £1,830 | £1,759 | £1,692 | £1,626 | £1,564 | £1,504 | £1,446 | £1,390 | £1,337 | £1,285 | £1,236 | £1,188 | £1,143 | £1,099 | £1,057 | £1,016 | £977 | £939 | £903 | £868 | £835 | £803 | £772 | £742 | £714 | £686 | £660 | £635 | 5 £6/m² |
| Electricity cost - Comfort cooling | £0 | £60 | £58 | £56 | £54 | £52 | £51 | £49 | £47 | £45 | £44 | £43 | £42 | £40 | £38 | £37 | £37 | £35 | £34 | £33 | £31 | £31 | £30 | £29 | £28 | £26 | £26 | £25 | £24 | £23 | £22 | 738kWh/annum @ 8.5p/kWh |
| Total | £80,160 | £6,046 | £5,813 | £5,590 | £5,375 | £5,168 | £4,973 | £4,782 | £4,598 | £4,421 | £21,630 | £4,091 | £3,933 | £3,782 | £3,637 | £3,497 | £3,365 | £3,236 | £3,111 | £2,991 | £32,301 | £2,768 | £2,662 | £2,559 | £2,461 | £8,251 | £2,277 | £2,190 | £2,105 | £2,024 | -£9,376 | 3 |
| Cumulative | £80,160 | £86,206 | £92,019 | £97,609 | £102,983 | £108,151 | £113,124 | £117,906 | £122,504 | £126,925 | £148,554 | £152,645 | £156,579 | £160,361 | £163,997 | £167,494 | £170,859 | £174,094 | £177,206 | £180,197 | £212,498 | £215,266 £ | 217,928 | £220,487 | £222,948 | £231,199 | £233,476 | £235,665 | £237,771 | £239,795 | £230,419 | |

Whole Life Costs - Individual plant, no CHP, 4% Discount Rate

| Description | | | | | | | | | | | | | | | | Years | | | | | | | | | | | | | | | | Notoo |
|--|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------|---------|----------|----------|----------|----------|---|
| Description | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | Notes |
| E Capital cost - PV panels | £21,000 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £C | £3000/kWp (installed), 7kWp |
| Replacement cost | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £7,877 | £0 | £0 | £0 | £0 | £0 | PV panels replaced at 25 years |
| Residual value | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £5,180 | PV panels 20 years |
| Ö Displaced electricity (PVs) | £0 | -£579 | -£557 | -£536 | -£515 | -£495 | -£491 | -£472 | -£453 | -£436 | -£419 | -£415 | -£399 | -£384 | -£369 | -£355 | -£352 | -£338 | -£325 | -£313 | -£301 | -£298 | -£286 | -£275 | -£265 | -£254 | -£252 | -£242 | -£233 | -£224 | -£215 | 7089kWh/annum @ 8.5p/kWh |
| Capital cost - Individual combi boilers | £14,000 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £1500 per apartment + £5000 for gas distribution |
| Replacement cost | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £6,080 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £4,107 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £C | Boiler replaced at 10 and 20 years |
| Operation/maintenance | £0 | £1,154 | £1,109 | £1,067 | £1,026 | £986 | £948 | £912 | £877 | £843 | £811 | £779 | £750 | £721 | £693 | £666 | £641 | £616 | £592 | £570 | £548 | £527 | £506 | £487 | £468 | £450 | £433 | £416 | £400 | £385 | £370 | £200/year per apartment |
| av Residual value | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | -£617 | Gas pipew ork 20 years |
| Gas cost - Individual combi boilers | £0 | £1,218 | £1,171 | £1,126 | £1,083 | £1,041 | £1,031 | £992 | £953 | £917 | £881 | £873 | £839 | £807 | £776 | £746 | £739 | £711 | £683 | £657 | £632 | £626 | £602 | £578 | £556 | £535 | £530 | £509 | £490 | £471 | £453 | Heat output 32398kWh/annum, Boiler gas input 36402kWh @ 3.48p/kWh |
| Capital cost - VRV (heating/cooling) | £30,870 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £C | £90/m² for office (including fit-out) |
| Capital cost - Solar thermal | £5,000 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £C | £5000 (installed) |
| Replacement cost | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £17,141 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £1,876 | £0 | £0 | £0 | £0 | £C | VRV at 15 years, solar thermal at 25 years |
| Operation/maintenance - VRV | £0 | £2,309 | £2,220 | £2,134 | £2,052 | £1,973 | £1,898 | £1,825 | £1,754 | £1,687 | £1,622 | £1,560 | £1,500 | £1,442 | £1,387 | £1,333 | £1,282 | £1,233 | £1,185 | £1,140 | £1,096 | £1,054 | £1,013 | £974 | £937 | £901 | £866 | £833 | £801 | £770 | £740 | £7/m² |
| E Residual value | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £0 | £1,233 | Solar thermal 20 years |
| Electricity cost - VRV (heating/cooling) | £0 | £239 | £230 | £221 | £213 | £204 | £202 | £195 | £187 | £180 | £173 | £171 | £165 | £158 | £152 | £147 | £145 | £140 | £134 | £129 | £124 | £123 | £118 | £114 | £109 | £105 | £104 | £100 | £96 | £92 | £89 | 2926kWh/annum @ 8.5p/kWh |
| Electricity cost - DHW | £0 | £126 | £121 | £116 | £112 | £108 | £107 | £103 | £99 | £95 | £91 | £90 | £87 | £83 | £80 | £77 | £76 | £73 | £71 | £68 | £65 | £65 | £62 | £60 | £58 | £55 | £55 | £53 | £51 | £49 | £47 | 1541kWh/annum @ 8.5p/kWh |
| Displaced electricity (Solar thermal) | £0 | -£6 | -£5 | -£5 | -£5 | -£5 | -£5 | -£5 | -£4 | -£4 | -£4 | -£4 | -£4 | -£4 | -£4 | -£3 | -£3 | -£3 | -£3 | -£3 | -£3 | -£3 | -£3 | -£3 | -£3 | -£2 | -£2 | -£2 | -£2 | -£2 | -£2 | 68kWh/annum@8.5p/kWh |
| Total | £70,870 | £4,461 | £4,289 | £4,124 | £3,966 | £3,813 | £3,691 | £3,549 | £3,413 | £3,281 | £9,235 | £3,055 | £2,937 | £2,824 | £2,715 | £19,752 | £2,528 | £2,431 | £2,338 | £2,248 | £6,269 | £2,093 | £2,012 | £1,935 | £1,861 | £11,542 | £1,733 | £1,666 | £1,602 | £1,541 | £7,278 | |
| Cumulative | £70,870 | £75,331 | £79,620 | £83,744 | £87,710 | £91,523 | £95,214 | £98,763 | £102,175 | 2105,456 | £114,692 | £117,746 | £120,683 | £123,507 | £126,223 | £145,975 | £148,503 | £150,934 | £153,272 | £155,519 | £161,788 | £163,881 | £165,894 | £167,829 | £169,689 | £181,231 £ | 182,964 | £184,631 | £186,233 | £187,773 | £195,051 | |

MEIN-ARDT

1-5 Portpool Lane, London Energy Statement

Appendix C – SBEM Calculations





Compliance with England and Wales Building Regulations Part L 2010

Project name

1-5 Portpool Lane - Solar Thermal and PV As designed

Date: Tue Sep 30 16:55:16 2014

Administrative information

Building Details Address: Portpool Lane, London, WC1

Certification tool

Calculation engine: SBEM

Calculation engine version: v4.1.e.5

Interface to calculation engine: Virtual Environment Interface to calculation engine version: v6.4.0 BRUKL compliance check version: v4.1.e.5

Owner Details

Name: Name Telephone number: Phone Address: Street Address, City, Postcode

Certifier details

Name: Bryan Wood Telephone number: 01904 674890 Address: Clifford Chambers, 4 Clifford Street, York, YO1 9RD

Criterion 1: The calculated CO₂ emission rate for the building should not exceed the target

| 1.1 | CO2 emission rate from the notional building, kgCO2/m2.annum | 20.9 |
|-----|--|---------------------|
| 1.2 | Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum | 20.9 |
| 1.3 | Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum | 12.6 |
| 1.4 | Are emissions from the building less than or equal to the target? | BER =< TER |
| 1.5 | Are as built details the same as used in the BER calculations? | Separate submission |

Criterion 2: The performance of the building fabric and the building services should achieve reasonable overall standards of energy efficiency

2.a Building fabric

| Ua-Limit | Ua-Calc | Ui-Calc | Surface where the maximum value occurs' |
|----------|---|---|--|
| 0.35 | 0.15 | 0.15 | NT000002_W11 |
| 0.25 | 0.18 | 0.18 | ST000004_F1 |
| 0.25 | H 3 | - | "No heat loss roofs" |
| 2.2 | 1.5 | 1.5 | FF000007 W-1-W1 |
| 2.2 | 2.09 | 2.09 | NT000002_W1-W0 |
| 1.5 | - | - | "No external vehicle access doors" |
| 3.5 | ÷ | 1 | "No external high usage entrance doors" |
| | 0.35 0.25 0.25 2.2 2.2 1.5 | 0.35 0.15 0.25 0.18 0.25 - 2.2 1.5 2.2 2.09 1.5 - | 0.35 0.15 0.15 0.25 0.18 0.18 0.25 - - 2.2 1.5 1.5 2.2 2.09 2.09 1.5 - - |

Ua-calc = Calculated area-weighted average U-values [W/(m²K)]

Ui-calc = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|--------------------|---------------------------|---------------|
| m3/(h.m2) at 50 Pa | 10 | 3 |

2.b Building services

The building services parameters listed below are expected to be checked by the BCO against guidance. No automatic checking is performed by the tool.

| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | YES |
|--|------|
| Whole building electric power factor achieved by power factor correction | <0.9 |

1-1-5 PORTPOOL Heating

| Heating seasonal efficiency | Cooling nominal efficiency | SFP [W/(l/s)] | HR seasonal | efficiency |
|------------------------------|----------------------------------|---------------------|---------------|------------|
| 5.75 | 3.86 | - | - | |
| Automatic monitoring & targe | eting with alarms for out-of-rai | nge values for this | s HVAC system | NO |

1- SYST0000-DHW

| Heating seasonal efficiency | Hot water storage loss factor [kWh/litre per day] | |
|-----------------------------|---|--|
| 1 | 0.013 | |

"No zones in project where local mechanical ventilation or exhaust is applicable"

General lighting and display lighting

| Zone | General lighting [W] | Display lamps efficacy [Im/W] |
|----------------|----------------------|-------------------------------|
| Cupboards | 40 | |
| Cupboards | 20 | |
| Cupboards | 30 | - |
| Store and lift | 60 | - |
| Office BF | 1530 | - |
| Office GF | 1060 | |

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|-----------|--------------------------------|-----------------------|
| Office BF | N/A | N/A |
| Office GF | NO (-60.8%) | NO |

Criterion 4: The performance of the building, as built, should be consistent with the BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

| Were alternative energy systems considered and analysed as part of the design process? | NO |
|--|----|
| Is evidence of such assessment available as a separate submission? | NO |
| Are any such measures included in the proposed design? | NO |

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

| | Actual | Notional | % Are |
|--------------------------------------|--------|----------|--------|
| Area [m ²] | 342.9 | 342.9 | |
| External area [m2] | 571.2 | 571.2 | - |
| Weather | GLA | GLA | 100 |
| Infiltration [m3/hm2@ 50Pa] | 3 | 5 | |
| Average conductance [W/K] | 159.65 | 364.7 | |
| Average U-value [W/m ² K] | 0.28 | 0.64 | |
| Alpha value* [%] | 24.03 | 14.39 | - - |

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

6 Area Building Type

| A1/A2 Retail/Financial and Professional services | |
|---|--|
| A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways | |
| B1 Offices and Workshop businesses | |
| B2 to B7 General Industrial and Special Industrial Groups | |
| B8 Storage or Distribution | |
| C1 Hotels | |
| C2 Residential Inst.; Hospitals and Care Homes | |
| C2 Residential Inst.: Residential schools | |
| C2 Residential Inst.: Universities and colleges | |
| C2A Secure Residential Inst. | |
| Residential spaces | |
| D1 Non-residential Inst.: Community/Day Centre | |
| D1 Non-residential Inst.: Libraries, Museums, and Galleries | |
| D1 Non-residential Inst.: Education | |
| D1 Non-residential Inst .: Primary Health Care Building | |
| D1 Non-residential Inst.: Crown and County Courts | |
| D2 General Assembly and Leisure, Night Clubs and Theatres | |
| Others: Passenger terminals | |
| Others: Emergency services | |
| Others: Miscellaneous 24hr activities | |
| Others: Car Parks 24 hrs | |
| | |

Others - Stand alone utility block

Energy Consumption by End Use [kWh/m²]

| | Antonia | |
|------------|---------|----------|
| | Actual | Notional |
| Heating | 6.38 | 20.83 |
| Cooling | 2.15 | 5.78 |
| Auxiliary | 0 | 0 |
| Lighting | 15.21 | 12.85 |
| Hot water | 4.49 | 3.32 |
| Equipment* | 39.84 | 39.84 |
| TOTAL** | 28.24 | 42.78 |

* Energy used by equipment does not count towards the total for calculating emissions. ** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

| | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems | 3.75 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0.2 | 0 |

Energy & CO₂ Emissions Summary

| | Actual | Indicative Target |
|---|--------|-------------------|
| Heating + cooling demand [MJ/m ²] | 168.08 | 257.18 |
| Primary energy* [kWh/m ²] | 82.46 | 115.87 |
| Total emissions [kg/m ²] | 12.6 | 20.9 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

| I | HVAC Sys | stems Pe | rformanc | e | | | 5. 3 | | | |
|-----|---------------|-------------------|-------------------|---|---------------|---|---------------|---------------|------------------|------------------|
| Sy | stem Type | Heat dem MJ/m2 | Cool dem MJ/m2 | Concernance of the second second second | | The second second second second second second | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
| [5] | [] Split or m | ulti-split sy | stem, [HS] | Heat pump | (electric): a | air source, | [HFT] Elec | tricity, [CF] |] Electricity | |
| | Actual | 123.1 | 45 | 6.4 | 2.2 | 0 | 5.36 | 5.81 | 5.75 | 8.18 |
| | Notional | 182.2 | 75 | 20.8 | 5.8 | 0 | 2.43 | 3.6 | | |

Key to terms

| Heat dem [MJ/m2] | = Heating energy demand |
|-------------------|---|
| Cool dem [MJ/m2] | = Cooling energy demand |
| Heat con [kWh/m2] | = Heating energy consumption |
| Cool con [kWh/m2] | = Cooling energy consumption |
| Aux con [kWh/m2] | = Auxiliary energy consumption |
| Heat SSEFF | = Heating system seasonal efficiency (for notional building, value depends on activity glazing class) |
| Cool SSEER | = Cooling system seasonal energy efficiency ratio |
| Heat gen SSEFF | = Heating generator seasonal efficiency |
| Cool gen SSEER | = Cooling generator seasonal energy efficiency ratio |
| ST | = System type |
| HS | = Heat source |
| HFT | = Heating fuel type |
| CFT | = Cooling fuel type |

Key Features

The BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

| Element | UI-Typ | Ui-Min | Surface where the minimum value occurs* |
|--|--------|------------|--|
| Wall | 0.23 | 0.15 | NT000002_W11 |
| Floor | 0.2 | 0.18 | ST000004_F1 |
| Roof | 0.15 | - | "No heat loss roofs" |
| Windows, roof windows, and rooflights | 1.5 | 1.5 | FF000007_W-1-W1 |
| Personnel doors | 1.5 | 2.09 | NT000002 W1-W0 |
| Vehicle access & similar large doors | 1.5 | - | "No external vehicle access doors" |
| High usage entrance doors | 1.5 | | "No external high usage entrance doors" |
| U _{FTyp} = Typical individual element U-values [W/(m ² k * There might be more than one surface where the | | J-value oc | U _{HMin} = Minimum individual element U-values [W/(m ² K)] |

| Air Permeability | Typical value | This building | |
|--------------------|---------------|---------------|--|
| m3/(h.m2) at 50 Pa | 5 | 3 | |

BRUKL Output Document IM Government

Compliance with England and Wales Building Regulations Part L 2010

Project name

1-5 Portpool Lane - Solar Thermal

As designed

Date: Tue Sep 30 16:57:15 2014

Administrative information

Building Details

Address: Portpool Lane, London, WC1

Certification tool

Calculation engine: SBEM

Calculation engine version: v4.1.e.5

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v6.4.0

BRUKL compliance check version: v4.1.e.5

Owner Details

Name: Name Telephone number: Phone Address: Street Address, City, Postcode

Certifier details Name: Bryan Wood Telephone number: 01904 674890 Address: Clifford Chambers, 4 Clifford Street, York, YO1 9RD

Criterion 1: The calculated CO₂ emission rate for the building should not exceed the target

| 1.1 | CO2 emission rate from the notional building, kgCO2/m2.annum | 20.9 |
|-----|--|---------------------|
| 1.2 | Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum | 20.9 |
| 1.3 | Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum | 14.6 |
| 1.4 | Are emissions from the building less than or equal to the target? | BER =< TER |
| 1.5 | Are as built details the same as used in the BER calculations? | Separate submission |

Criterion 2: The performance of the building fabric and the building services should achieve reasonable overall standards of energy efficiency

2.a Building fabric

| 0.15 0.18 | 0.15 | NT000002_W11 ST000004_F1 |
|--------------|------|---|
| 0.18 | 0.18 | ST000004 E 1 |
| - | | 3100004_F1 |
| - | ÷ | "No heat loss roofs" |
| 1.5 | 1.5 | FF000007_W-1-W1 |
| 2.09 | 2.09 | NT000002_W1-W0 |
| - | - | "No external vehicle access doors" |
| - | 4 | "No external high usage entrance doors" |
| | 1.5 | 1.5 1.5 |

 U_{a-Calc} = Calculated area-weighted average U-values [W/(IITK)] U_{a-Calc} = Calculated area-weighted average U-values [W/(IITK)]

U_{I-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building | |
|--------------------|---------------------------|---------------|--|
| m3/(h.m2) at 50 Pa | 10 | 3 | |

2.b Building services

The building services parameters listed below are expected to be checked by the BCO against guidance. No automatic checking is performed by the tool.

| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | YES |
|--|------|
| Whole building electric power factor achieved by power factor correction | <0.9 |

1-1-5 PORTPOOL Heating

| Heating seasonal efficiency | Cooling nominal efficiency | SFP [W/(I/s)] | HR seasonal efficiency |
|-----------------------------|----------------------------------|---------------------|------------------------|
| 5.75 | 3.86 | - | - |
| Automatic monitoring & targ | eting with alarms for out-of-rai | nge values for this | s HVAC system NO |

1- SYST0000-DHW

| Heating seasonal efficiency | Hot water storage loss factor [kWh/litre per day] | |
|-----------------------------|---|--|
| 1 | 0.013 | |

"No zones in project where local mechanical ventilation or exhaust is applicable"

General lighting and display lighting

| Zone | General lighting [W] | Display lamps efficacy [Im/W] | | |
|----------------|----------------------|-------------------------------|--|--|
| Cupboards | 40 | - | | |
| Cupboards | 20 | | | |
| Cupboards | 30 | - | | |
| Store and lift | 60 | - | | |
| Office BF | | | | |
| Office GF | 1060 | - | | |

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|-----------|--------------------------------|-----------------------|
| Office BF | N/A | N/A |
| Office GF | NO (-60.8%) | NO |

Criterion 4: The performance of the building, as built, should be consistent with the BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

| Were alternative energy systems considered and analysed as part of the design process? | NO |
|--|----|
| Is evidence of such assessment available as a separate submission? | NO |
| Are any such measures included in the proposed design? | NO |

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

| | Actual | Notional | % A |
|--------------------------------------|--------|----------|---------------|
| Area [m ²] | 342.9 | 342.9 | - |
| External area [m ²] | 571.2 | 571.2 | and other law |
| Weather | GLA | GLA | 100 |
| Infiltration [m³/hm²@ 50Pa] | 3 | 5 | - |
| Average conductance [W/K] | 159.65 | 364.7 | |
| Average U-value [W/m ² K] | 0.28 | 0.64 | - |
| Alpha value* [%] | 24.03 | 14.39 | |

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area Building Type

A1/A2 Retail/Financial and Professional services A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways **B1 Offices and Workshop businesses** B2 to B7 General Industrial and Special Industrial Groups B8 Storage or Distribution C1 Hotels C2 Residential Inst.: Hospitals and Care Homes C2 Residential Inst.: Residential schools C2 Residential Inst .: Universities and colleges C2A Secure Residential Inst. Residential spaces D1 Non-residential Inst.: Community/Day Centre D1 Non-residential Inst.: Libraries, Museums, and Galleries D1 Non-residential Inst.: Education D1 Non-residential Inst .: Primary Health Care Building D1 Non-residential Inst.: Crown and County Courts D2 General Assembly and Leisure, Night Clubs and Theatres Others: Passenger terminals Others: Emergency services Others: Miscellaneous 24hr activities Others: Car Parks 24 hrs Others - Stand alone utility block

Energy Consumption by End Use [kWh/m²]

| | Actual | Notional | | |
|------------|--------|----------|--|--|
| Heating | 6.38 | 20.83 | | |
| Cooling | 2.15 | 5.78 | | |
| Auxiliary | 0 | 0 | | |
| Lighting | 15.21 | 12.85 | | |
| Hot water | 4.49 | 3.32 | | |
| Equipment* | 39.84 | 39.84 | | |
| TOTAL** | 28.24 | 42.78 | | |

* Energy used by equipment does not count towards the total for calculating emissions. ** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

| | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems | 0 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0.2 | 0 |

Energy & CO₂ Emissions Summary

| | Actual | Indicative Target |
|---|--------|-------------------|
| Heating + cooling demand [MJ/m ²] | 168.08 | 257.18 |
| Primary energy* [kWh/m ²] | 82.46 | 115.87 |
| Total emissions [kg/m ²] | 14.6 | 20.9 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

| System Type | Heat dem MJ/m2 | | | Cool con kWh/m2 | The state of the second s | Heat SSEEF | Cool SSEER | Heat gen | Cool ger SEER |
|-----------------|-------------------|------------|-----------|--------------------|--|---------------|---------------|---------------|---|
| [ST] Split or r | nulti-split sy | stem, [HS] | Heat pump | (electric): a | air source, | | |] Electricity | the second se |
| Astual | 123.1 | 45 | 6.4 | 2.2 | 0 | 5.36 | 5.81 | 5.75 | 8.18 |
| Actual | 120.1 | 10 | | | | | | | |

Key to terms

| Heat dem [MJ/m2] | = Heating energy demand |
|-------------------|---|
| Cool dem [MJ/m2] | = Cooling energy demand |
| Heat con [kWh/m2] | = Heating energy consumption |
| Cool con [kWh/m2] | = Cooling energy consumption |
| Aux con [kWh/m2] | = Auxiliary energy consumption |
| Heat SSEFF | = Heating system seasonal efficiency (for notional building, value depends on activity glazing class) |
| Cool SSEER | = Cooling system seasonal energy efficiency ratio |
| Heat gen SSEFF | = Heating generator seasonal efficiency |
| Cool gen SSEER | = Cooling generator seasonal energy efficiency ratio |
| ST | = System type |
| HS | = Heat source |
| HFT | = Heating fuel type |
| CFT | = Cooling fuel type |

Key Features

The BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

| Element | UI-Typ | Ui-Min | Surface where the minimum value occurs* | |
|---|--------------|------------|---|--|
| Wall | 0.23 | 0.15 | NT000002_W11 | |
| Floor | 0.2 | 0.18 | ST000004 F -1 | |
| Roof | 0.15 | - | "No heat loss roofs" | |
| Windows, roof windows, and roofligh | ts 1.5 | 1.5 | FF000007_W-1-W1 | |
| Personnel doors | 1.5 | 2.09 | NT000002_W1-W0 | |
| Vehicle access & similar large doors | 1.5 | - | "No external vehicle access doors" | |
| High usage entrance doors | 1.5 | - | "No external high usage entrance doors" | |
| U _{FTyp} = Typical individual element U-values [W * There might be more than one surface when | | J-value oc | U _{i-Min} = Minimum individual element U-values [W/(m ² K)] curs. | |
| Air Permeability | Typical valu | le | This building | |

| Air Permeability | Typical value | This building | |
|--------------------|---------------|---------------|--|
| m³/(h.m²) at 50 Pa | 5 | 3 | |

BRUKL Output Document HM Government

Compliance with England and Wales Building Regulations Part L 2010

Project name

1-5 Portpool Lane - No Renewables

As designed

Date: Tue Sep 30 16:58:23 2014

Administrative information

Building Details

Address: Portpool Lane, London, WC1

Certification tool

Calculation engine: SBEM

Calculation engine version: v4.1.e.5

Interface to calculation engine: Virtual Environment Interface to calculation engine version: v6.4.0 BRUKL compliance check version: v4.1.e.5

Owner Details

Name: Name Telephone number: Phone Address: Street Address, City, Postcode

Certifier details

Name: Bryan Wood Telephone number: 01904 674890 Address: Clifford Chambers, 4 Clifford Street, York, YO1 9RD

Criterion 1: The calculated CO₂ emission rate for the building should not exceed the target

| 1.5 | Are as built details the same as used in the BER calculations? | Separate submission |
|-----|--|---------------------|
| 1.4 | Are emissions from the building less than or equal to the target? | BER =< TER |
| 1.3 | Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum | 14.7 |
| 1.2 | Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum | 20.9 |
| | CO2 emission rate from the notional building, kgCO2/m2.annum | 20.9 |

Criterion 2: The performance of the building fabric and the building services should achieve reasonable overall standards of energy efficiency

2.a Building fabric

| 0.15 | NT000002_W11 ST000004_F1 "No heat loss roofs" |
|------|---|
| - | "No heat loss roofs" |
| - | |
| | |
| 1.5 | FF000007_W-1-W1 |
| 2.09 | NT000002_W1-W0 |
| -0 | "No external vehicle access doors" |
| - | "No external high usage entrance doors" |
| | - |

Ua-cate = Calculated area-weighted average U-values [W/(m²K)]

U-cate = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|--------------------|---------------------------|---------------|
| m³/(h.m²) at 50 Pa | 10 | 3 |

2.b Building services

The building services parameters listed below are expected to be checked by the BCO against guidance. No automatic checking is performed by the tool.

| Whole building lighting automatic monitoring & targeting with alarms for out-of-range values | YES |
|--|-----|
| Whole building electric power factor achieved by power factor correction | |

1-1-5 PORTPOOL Heating

| Heating seasonal efficiency | Cooling nominal efficiency | SFP [W/(l/s)] | HR seasonal efficiency | |
|---|----------------------------|---------------|------------------------|--|
| 5.75 | 3.86 | - | | |
| Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system | | | | |

1- SYST0000-DHW

| Heating seasonal efficiency | Hot water storage loss factor [kWh/litre per day] | |
|-----------------------------|---|--|
| 1 | 0.013 | |

"No zones in project where local mechanical ventilation or exhaust is applicable"

General lighting and display lighting

| Zone | General lighting [W] | Display lamps efficacy [lm/W | |
|----------------|----------------------|------------------------------|--|
| Cupboards | 40 | - | |
| Cupboards | 20 | | |
| Cupboards | 30 | + | |
| Store and lift | 60 | ÷. | |
| Office BF | 1530 | (A=C). | |
| Office GF | 1060 | <u>-</u> | |

Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|-----------|--------------------------------|-----------------------|
| Office BF | N/A | N/A |
| Office GF | NO (-60.8%) | NO |

Criterion 4: The performance of the building, as built, should be consistent with the BER

Separate submission

Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

EPBD (Recast): Consideration of alternative energy systems

| Were alternative energy systems considered and analysed as part of the design process? | NO |
|--|----|
| Is evidence of such assessment available as a separate submission? | NO |
| Are any such measures included in the proposed design? | NO |

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

| | Actual | Notional | % Area |
|--------------------------------------|--------|----------|-----------------------|
| Area [m ²] | 342.9 | 342.9 | |
| External area [m ²] | 571.2 | 571.2 | and the second second |
| Weather | GLA | GLA | 100 |
| Infiltration [m3/hm2@ 50Pa] | 3 | 5 | |
| Average conductance [W/K] | 159.65 | 364.7 | |
| Average U-value [W/m ² K] | 0.28 | 0.64 | |
| Alpha value* [%] | 24.03 | 14.39 | |

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

6 Area Building Type

| | - |
|---|---|
| A1/A2 Retail/Financial and Professional services | |
| A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways | |
| B1 Offices and Workshop businesses | |
| B2 to B7 General Industrial and Special Industrial Groups | |
| B8 Storage or Distribution | |
| C1 Hotels | |
| C2 Residential Inst.: Hospitals and Care Homes | |
| C2 Residential Inst.: Residential schools | |
| C2 Residential Inst.: Universities and colleges | |
| C2A Secure Residential Inst. | |
| Residential spaces | |
| D1 Non-residential Inst.: Community/Day Centre | |
| D1 Non-residential Inst.: Libraries, Museums, and Galleries | |
| D1 Non-residential Inst.; Education | |
| D1 Non-residential Inst .: Primary Health Care Building | |
| D1 Non-residential Inst.: Crown and County Courts | |
| D2 General Assembly and Leisure, Night Clubs and Theatres | |
| Others: Passenger terminals | |
| Others: Emergency services | |
| Others: Miscellaneous 24hr activities | |
| Others: Car Parks 24 hrs | |
| | |

Others - Stand alone utility block

Energy Consumption by End Use [kWh/m²]

| | Actual | Notional |
|------------|--------|----------|
| Heating | 6.38 | 20.83 |
| Cooling | 2.15 | 5.78 |
| Auxiliary | 0 | 0 |
| Lighting | 15.21 | 12.85 |
| Hot water | 4.69 | 3.32 |
| Equipment* | 39.84 | 39.84 |
| TOTAL** | 28.44 | 42.78 |

* Energy used by equipment does not count towards the total for calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

| | Actual | Notional |
|-----------------------|--------|----------|
| Photovoltaic systems | 0 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0 | 0 |

Energy & CO₂ Emissions Summary

| | Actual | Indicative Target |
|---|--------|-------------------|
| Heating + cooling demand [MJ/m ²] | 168.08 | 257.18 |
| Primary energy* [kWh/m ²] | 83.04 | 115.87 |
| Total emissions [kg/m ²] | 14.7 | 20.9 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

| 4 | HVAC Sys | stems Pe | rformanc | e | | | | | | |
|----|---------------|-------------------|-------------------|-----------|--------------------|-------------|---------------|---------------|------------------|------------------|
| Sy | stem Type | Heat dem MJ/m2 | Cool dem MJ/m2 | | Cool con kWh/m2 | | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool ger SEER |
| [S | T] Split or m | ulti-split sy | stem, [HS] | Heat pump | (electric): a | air source, | [HFT] Elec | tricity, [CF1 |] Electricity | |
| | Actual | 123.1 | 45 | 6.4 | 2.2 | 0 | 5.36 | 5.81 | 5.75 | 8.18 |
| | Notional | 182.2 | 75 | 20.8 | 5.8 | 0 | 2.43 | 3.6 | | |

Key to terms

| 1 | Heat dem [MJ/m2] | = Heating energy demand |
|---|-------------------|---|
| | Cool dem [MJ/m2] | = Cooling energy demand |
| | Heat con [kWh/m2] | = Heating energy consumption |
| | Cool con [kWh/m2] | = Cooling energy consumption |
| | Aux con [kWh/m2] | = Auxiliary energy consumption |
| | Heat SSEFF | = Heating system seasonal efficiency (for notional building, value depends on activity glazing class) |
| | Cool SSEER | = Cooling system seasonal energy efficiency ratio |
| | Heat gen SSEFF | = Heating generator seasonal efficiency |
| | Cool gen SSEER | = Cooling generator seasonal energy efficiency ratio |
| | ST | = System type |
| | HS | = Heat source |
| | HFT | = Heating fuel type |
| | CFT | = Cooling fuel type |
| | | |

Key Features

The BCO can give particular attention to items with specifications that are better than typically expected.

Building fabric

| Element | Ui-Typ | Ui-Min | Surface where the minimum value occurs | | |
|--|--------|------------|---|--|--|
| Wall | 0.23 | 0.15 | NT000002_W11 | | |
| Floor | 0.2 | 0.18 | ST000004_F1 | | |
| Roof | 0.15 | - | "No heat loss roofs" | | |
| Windows, roof windows, and rooflights | 1.5 | 1.5 | FF000007_W-1-W1 | | |
| Personnel doors | 1.5 | 2.09 | NT000002_W1-W0 | | |
| Vehicle access & similar large doors | 1.5 | - | "No external vehicle access doors" | | |
| High usage entrance doors | 1.5 | - | "No external high usage entrance doors" | | |
| U _{FTyp} = Typical individual element U-values [W/(m ² + * There might be more than one surface where the | | J-value oc | U _{HMin} = Minimum individual element U-values [W/(m ² K)] curs. | | |

| Air Permeability | Typical value | This building | | |
|--------------------|---------------|---------------|--|--|
| m3/(h.m2) at 50 Pa | 5 | 3 | | |



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