FUTURE
PLANNING AND DEVELOPMENT

Addison Estate, 702 Field End Road, Ruislip, HA4 0QP

# ENERGY STATEMENT

*9 residential units and 1630sqm of B8 self-storage*

January 2023

## Document Issue Register

1.0 Planning Issue

## Contents

# 1 Introduction

1.1 This report details an Energy Statement for the proposed development at Addison Estate, 702 Field End Road, Ruislip, HA4 0QP. The scheme involves the demolition of the existing industrial floorspace and the replacement with 9no. new residential units along with 1630sqm of B8 self-storage.

1.2 The site is located in Ruislip, Hillingdon in the north-west of London. The existing site comprises industrial floorspace over two stories, surrounded by hardstanding used for car parking.

1.3 The proposed new buildings will feature insulation standards which meet and exceed current building regulations, along with energy efficient air-source heat pumps and a solar PV array.

1.4 The purpose of this report is to review the sustainability requirements at local (borough) and national level, and to discuss how these requirements have been met. The requirements relate to the Hillingdon Local Plan (Core Strategy) 2012.


*Figure 1: Site (red), aerial view (source: Google Earth)*

## 2 Executive Summary

2.1 The development has been shown to meet the national & local sustainability requirements. These include the Building Regulations requirements, and the Hillingdon Local Plan Policy Part 1: EM1 and Part 2: DMEI 2.

| Policy | Requirements | Achieved? |
|---|---|---|
| **Hillingdon Local Plan Policy EM1** | Renewable energy will be encouraged in all new development | ✓ |
| **Hillingdon Local Plan Policy DMEI 2** | Make the 'fullest possible contribution' to meet the strategic CO2 reduction targets of the London Plan | ✓ |
| **Building Regulations Part L (2021)** | Demonstrate how the development complies with Part L (Vol 1 & 2) of the Building Regulations | ✓ |
| **BRE Water Efficiency Calculator Tool** | Target internal water use of 105 L/person/day | ✓ |

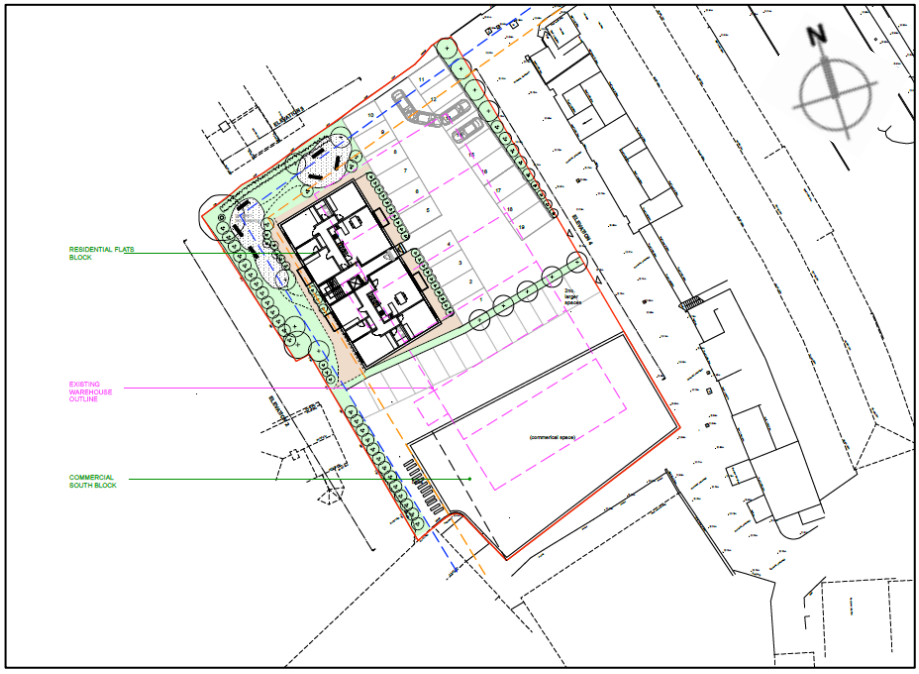



*Figure 2: Proposed development, site plan*

# 3 Local Requirements and Guidance

## 3.1 Hillingdon Local Plan Part 2 – Development Management Policy DMEI 2: Reducing Carbon Emissions

3.2 According to the Hillingdon Local Plan Part 2 – Development Management Policy DMEI 2, the council will seek to minimise Hillingdon's contribution to climate change by requiring development to make the 'fullest possible contribution' to meet the strategic carbon emissions reduction targets of the London Plan:

> **Policy DMEI 2: Reducing Carbon Emissions**
>
> **A) All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets.**
>
> **B) All major development[7] proposals must be accompanied by an energy assessment showing how these reductions will be achieved.**
>
> **C) Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an off-site contribution to make up for the shortfall.**

## 3.3 Hillingdon Local Plan Part 1 – Strategic Policy EM1: Climate Change Adaptation and Mitigation

3.4 According to the Hillingdon Local Plan Part 1 – Strategic Policy EM1, renewable energy will be encouraged in all new development to meet the London Plan targets. Further objectives are outlined overleaf:

## Policy EM1: Climate Change Adaptation and Mitigation

The Council will ensure that climate change mitigation is addressed at every stage of the development process by:

1. Prioritising higher density development in urban and town centres that are well served by sustainable forms of transport.
2. Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency.
3. Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market.
4. Working with developers of major schemes to identify the opportunities to help provide efficiency initiatives that can benefit the existing building stock.
5. Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.
6. Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.
7. Encouraging sustainable techniques to land remediation to reduce the need to transport waste to landfill. In particular developers should consider bioremediation(39) as part of their proposals.
8. Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan. Identify opportunities for new sources of electricity generation including anaerobic digestion, hydroelectricty and a greater use of waste as a resource.
9. Promoting new development to contribute to the upgrading of existing housing stock where appropriate.

The Borough will ensure that climate change adaptation is addressed at every stage of the development process by:

10. Locating and designing development to minimise the probability and impacts of flooding.
11. Requiring major development proposals to consider the whole water cycle impact which includes flood risk management, foul and surface water drainage and water consumption.
12. Giving preference to development of previously developed land to avoid the loss of further green areas.
13. Promoting the use of living walls and roofs, alongside sustainable forms of drainage to manage surface water run-off and increase the amount of carbon sinks(40).
14. Promoting the inclusion of passive design(41) measures to reduce the impacts of urban heat effects.

# 4 Discussion

## 4.1 Energy Strategy

4.2 The development will meet the requirements of Building Regulations Approved Document L (2021) 'Conservation of fuel and power' Volume 1: Dwellings; and Building Regulations Approved Document L (2021) 'Conservation of fuel and power' Volume 2: Buildings other than Dwellings.

4.3 This includes the U-values for thermal elements meeting the standards in Table 4.1 of the Approved Document L1, and the U-values for retained thermal elements meeting the standards in Table 4.3, using the approach under section 11.8 (below):

4.4 The three steps of the energy hierarchy will be followed in order to achieve the requirements of the Hillingdon Local Plan (Core Strategy): "Be Lean; Be Clean; Be Green". This ensures that a 'fabric-first' approach will be adopted.

4.5 Improved passive energy performance ('Be Lean') will be achieved through the specification of high-performing building fabric (U-values which improve upon the Part L requirements).

4.6 Please see Appendix 2: GLA CO2 Report and Appendix 3: As-Designed SAP & SBEM Reports for a full breakdown of residential and non-residential emissions.

4.7 The following U-values have been proposed for the buildings, which meet and exceed the Building Regulations requirements. The U-values are categorised according to 'residential' and 'non-residential' elements, as per the GLA guidance:

**L1 Table 4.1: Residential Thermal Elements**

| Element | Baseline (L1) | Proposed U-value |
|---|---|---|
| – Roof | 0.16 W/m²K | **0.10 W/m²K** |
| – External Walls | 0.26 W/m²K | **0.14 W/m²K** |
| – Floor | 0.18 W/m²K | **0.12 W/m²K** |
| – Windows (g-value: 0.63) | 1.60 W/m²K | **1.10 W/m²K** |

**L2 Table 4.1: Non-Residential Thermal Elements**

| | Element | Baseline (L2) | **Proposed U-value** |
|---|---|---|---|
| – | Roof (Flat) | 0.18 W/m²K | **0.18 W/m²K** |
| – | External Walls | 0.26 W/m²K | **0.26 W/m²K** |
| – | Floor | 0.18 W/m²K | **0.15 W/m²K** |
| – | Windows | 1.60 W/m²K | **1.60 W/m²K** |
| – | Personnel Doors | 1.60 W/m²K | **1.60 W/m²K** |
| – | Vehicle Doors | 1.30 W/m²K | **1.30 W/m²K** |

4.8 Efficient Building services will be installed which meet and exceed the Domestic and Non-Domestic Building Services Compliance Guide requirements, which includes air-source heat pumps, and LED lighting will be implemented throughout (Be Lean).

4.9 A 10kW solar PV array will be installed on the roof of the commercial unit, to further reduce carbon emissions for the site (Be Green).

**Residential Building Services:**

| | |
|---|---|
| **Heating** | Individual Air-Source Heat pumps (Grant Aerona 10kW or similar) |
| **Hot Water** | 150L DHW cylinder linked to ASHP |
| **Lighting** | LED lighting 90 Lum/W |
| **Ventilation** | Mechanical Ventilation with Heat Recovery (MVHR) |
| **Air Test** | 3.0 m³/m²@50Pa |

**Non-Residential Building Services:**

| | |
|---|---|
| **Heating** | VRV System Air-Source Heat pumps (Heating & Cooling) |
| **Hot Water** | Instantaneous electric water heaters |
| **Lighting** | LED lighting 100 Lum/W |
| **Air Test** | 8.0 m³/m²@50Pa |
| **Solar PV** | 10kW Solar PV Rooftop Array |

4.10 The regulated carbon emissions for the development have been determined based on modelled SAP results for a sample of units, implementing SAP 10.2, along with modelled SBEM results for the commercial unit (B8 warehouse/storage).

4.11 The following table displays the Total Emissions, according to the Energy Hierarchy, indicating the savings achieved through passive measures (fabric-first approach):

| | Total emissions (tonnes $CO_2$/yr) | $CO_2$ Savings (tonnes $CO_2$/yr) | % Saving |
|---|---|---|---|
| **Part L Baseline** | 14.2 | | |
| **Be Lean** | 13.0 | 1.2 | 8% |
| **Be Clean** | 13.0 | 0.0 | 0% |
| **Be Green** | 7.3 | 5.7 | 40% |
| **Cumulative Savings** | - | 6.8 | 48% |

4.12 **Water Use**

4.13 Please see Appendix 1 – BRE Water Efficiency Calculator for further details relating to water consumption. The BRE Water Efficiency Calculator Tool has been used to predict water usage for the proposed dwellings.

4.14 A target of 105L/person/day has been proposed by the Hillingdon Local Plan (Policy DMEI 10 and Policy EM8), which excludes 5L/person/day for external water use. This meets the Building Regulations Part G 'Optional' requirement of 110L/p/day.

4.15 The consumption of water will be kept to a minimum within the proposed new dwellings through the implementation of water efficient fittings and appliances. These will include the following:

- Low-flow taps and showers
- Dual Flush WC's
- Low volume (to overflow) bathtub

4.16 Through the implementation of water efficient fittings and appliances, waste water will also be reduced within the proposed new dwellings.

## 4.17 SUDS & Surface Water Run-Off

4.18 In terms of surface water run-off from the site, the sustainable drainage strategy will be designed to ensure all surface water is discharged through sustainable means.

4.19 As shown in the Flood Risk Map below, the site of the proposed development lies within Flood Zone 1: Low probability of flooding:

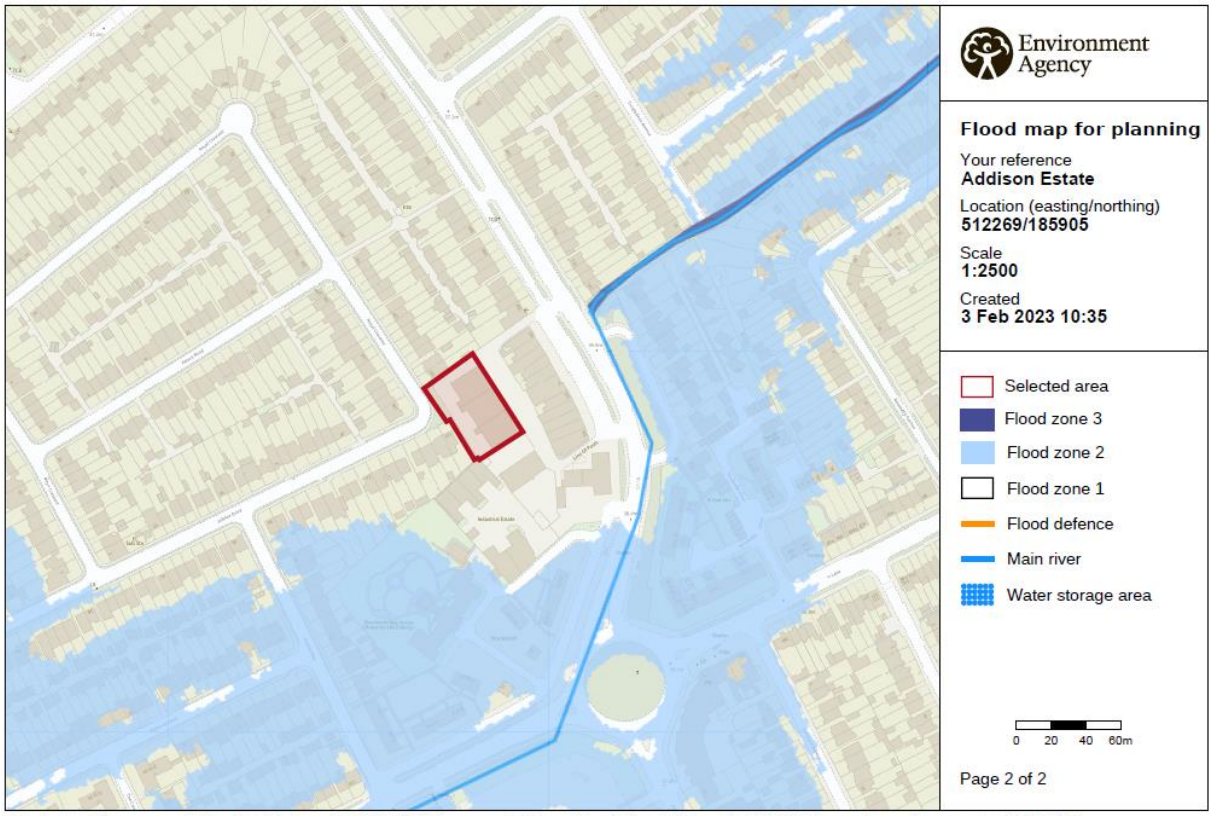





*Figure 3: Hillingdon Flood Zones (Source: Environment Agency)*

# 5 Appendix 1: BRE Water Efficiency Calculator Tool

breglobal

| | |
|---|---|
| Job no: | |
| Date: | 03/02/2023 |
| Assessor name: | |
| Registration no: | |
| Development name: | Addison Estate, Ruislip |



**PRINTING:** before printing please make sure that in "Page Setup" you have selected the page to be as "Landscape" and that the Scale has been set up to 70% (maximum)

## WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS - (BASIC CALCULATOR)

| | House Type: | Type 1 | | Type 2 | | Type 3 | | Type 4 | | Type 5 | | Type 6 | | Type 7 | | Type 8 | | Type 9 | | Type 10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Description: | 1-Bed Apartment | | 2-Bed Apartment | | 3-Bed Apartment | | | | | | | | | | | | | | | |
| Installation Type | Unit of measure | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day | Capacity/ flow rate | Litres/ person/ day |
| Is a dual or single flush WC specified? | | Dual | | Dual | | Dual | | Select option: | | Select option: | | Select option: | | Select option: | | Click to Select | | Click to Select | | Click to Select | |
| WC | Full flush volume | 4 | 5.84 | 4 | 5.84 | 4 | 5.84 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| | Part flush volume | 2.6 | 7.70 | 2.6 | 7.70 | 2.6 | 7.70 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Taps (excluding kitchen and external taps) | Flow rate (litres / minute) | 6 | 11.06 | 6 | 11.06 | 6 | 11.06 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Are both a Bath & Shower Present? | | Bath & Shower | | Bath & Shower | | Bath & Shower | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | |
| Bath | Capacity to overflow | 150 | 16.50 | 150 | 16.50 | 150 | 16.50 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Shower | Flow rate (litres / minute) | 9 | 39.33 | 9 | 39.33 | 9 | 39.33 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Kitchen sink taps | Flow rate (litres / minute) | 6 | 13.00 | 6 | 13.00 | 6 | 13.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Has a washing machine been specified? | | No | | No | | No | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | |
| Washing Machine | Litres / kg | 7.2 | 17.16 | 7.2 | 17.16 | 7.2 | 17.16 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Has a dishwasher been specified? | | No | | No | | No | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | | Select option: | |
| Dishwasher | Litres / place setting | 1.22 | 4.50 | 1.22 | 4.50 | 1.22 | 4.50 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| Has a waste disposal unit been specified? | | No | 0.00 | No | 0.00 | No | 0.00 | Select option: | 0.00 | Select option: | 0.00 | Select option: | 0.00 | Select option: | 0.00 | Select option: | 0.00 | Select option: | 0.00 | Select option: | 0.00 |
| Water Softener | Litres / person / day | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 | | 0.00 |
| | Calculated Use | | 115.1 | | 115.1 | | 115.1 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| | Normalisation factor | | 0.91 | | 0.91 | | 0.91 | | 0.91 | | 0.91 | | 0.91 | | 0.91 | | 0.91 | | 0.91 | | 0.91 |
| Code for Sustainable Homes | Total Consumption | | 104.7 | | 104.7 | | 104.7 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| | Mandatory level | | Level 3/4 | | Level 3/4 | | Level 3/4 | | - | | - | | - | | - | | - | | - | | - |
| Building Regulations 17.K | External use | | 5.0 | | 5.0 | | 5.0 | | 5.0 | | 5.0 | | 5.0 | | 5.0 | | 5.0 | | 5.0 | | 5.0 |
| | Total Consumption | | 109.7 | | 109.7 | | 109.7 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| | 17.K Compliance? | | Yes | | Yes | | Yes | | - | | - | | - | | - | | - | | - | | - |

# 6 Appendix 2: GLA CO2 Report

# Part L 2021 Performance

## Residential

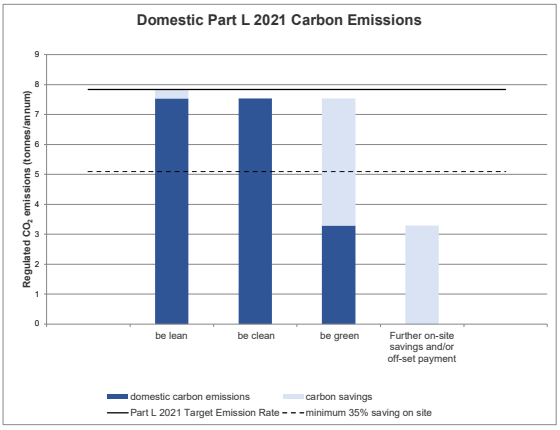
**Table 1:** Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

| | Carbon Dioxide Emissions for residential buildings (Tonnes $CO_2$ per annum) | |
|---|---|---|
| | Regulated | Unregulated |
| Baseline: Part L 2021 of the Building Regulations Compliant Development | 7.8 | |
| After energy demand reduction (be lean) | 7.5 | |
| After heat network connection (be clean) | 7.5 | |
| After renewable energy (be green) | 3.3 | |

**Table 2:** Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

| | Regulated residential carbon dioxide savings | |
|---|---|---|
| | (Tonnes $CO_2$ per annum) | (%) |
| Be lean: savings from energy demand reduction | 0.3 | 4% |
| Be clean: savings from heat network | 0.0 | 0% |
| Be green: savings from renewable energy | 4.3 | 54% |
| **Cumulative on site savings** | **4.5** | **58%** |
| Annual savings from off-set payment | 3.3 | - |
| | (Tonnes $CO_2$) | |
| **Cumulative savings for off-set payment** | **99** | - |
| **Cash in-lieu contribution (£)** | **9,365** | |

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab




## Non-residential

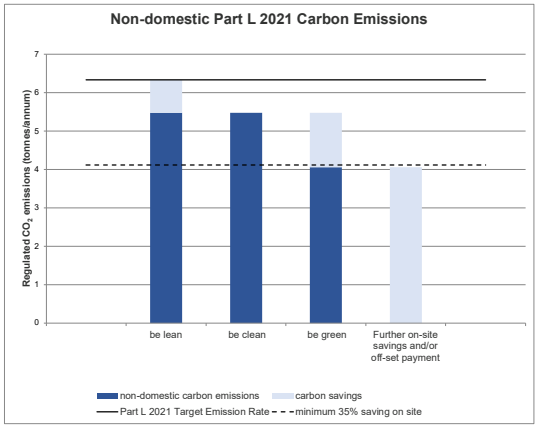
**Table 3:** Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-residential buildings

| | Carbon Dioxide Emissions for non-residential buildings (Tonnes $CO_2$ per annum) | |
|---|---|---|
| | Regulated | Unregulated |
| Baseline: Part L 2021 of the Building Regulations Compliant Development | 6.3 | |
| After energy demand reduction (be lean) | 5.5 | |
| After heat network connection (be clean) | 5.5 | |
| After renewable energy (be green) | 4.1 | |

**Table 4:** Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for non-residential buildings

| | Regulated non-residential carbon dioxide savings | |
|---|---|---|
| | (Tonnes $CO_2$ per annum) | (%) |
| Be lean: savings from energy demand reduction | 0.9 | 14% |
| Be clean: savings from heat network | 0.0 | 0% |
| Be green: savings from renewable energy | 1.4 | 22% |
| **Total Cumulative Savings** | **2.3** | **36%** |
| Annual savings from off-set payment | 4.1 | - |
| | (Tonnes $CO_2$) | |
| **Cumulative savings for off-set payment** | **122** | - |
| **Cash in-lieu contribution (£)** | **11,571** | |

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab




## SITE-WIDE

| | Total regulated emissions (Tonnes $CO_2$ / year) | $CO_2$ savings (Tonnes $CO_2$ / year) | Percentage savings (%) |
|---|---|---|---|
| Part L 2021 baseline | 14.2 | | |
| Be lean | 13.0 | 1.2 | 8% |
| Be clean | 13.0 | 0.0 | 0% |
| Be green | 7.3 | 5.7 | 40% |
| Total Savings | - | 6.8 | 48% |
| | - | **$CO_2$ savings off-set (Tonnes $CO_2$)** | - |
| Off-set | - | **220.4** | - |

| | Target Fabric Energy Efficiency (kWh/m²) | Dwelling Fabric Energy Efficiency (kWh/m²) | Improvement (%) |
|---|---|---|---|
| **Development total** | 0.00 | 0.00 | |

| | Area weighted non-residential cooling demand ($MJ/m^2$) | Total non-residential cooling demand (MJ/year) |
|---|---|---|
| **Actual** | | |
| **Notional** | | |

## EUI & space heating demand (predicted energy use)

### Residential

| Building type | EUI ($kWh/m^2$/year) (excluding renewable energy) | Space heating demand ($kWh/m^2$/year) (excluding renewable energy) | EUI value from Table 4 of the guidance ($kWh/m^2$/year) (excluding renewable energy) | Space heating demand from Table 4 of the guidance($kWh/m^2$/year) (excluding renewable energy) | Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology) | Explanatory notes (if expected performance differs from the Table 4 values in the guidance) |
|---|---|---|---|---|---|---|
| | | | | | | |

### Non-residential

| Building type | EUI ($kWh/m^2$/year) (excluding renewable energy) | Space heating demand ($kWh/m^2$/year) (excluding renewable energy) | EUI value from Table 4 of the guidance ($kWh/m^2$/year) (excluding renewable energy) | Space heating demand from Table 4 of the guidance($kWh/m^2$/year) (excluding renewable energy) | Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology) | Explanatory notes (if expected performance differs from the Table 4 values in the guidance) |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |

# 7 Appendix 3: As-Designed SAP & SBEM Reports

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | Flat 1 | **Issued on Date** | 31/01/2023 |
| **Assessment Reference** | Be Lean | **Prop Type Ref** | 3b6p |
| **Property** | Flat 1, 702 Field End Rd, Ruislip , Hillingdon, HA4 0QP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 80 C | **DER** | 5.28 | **TER** | 10.07 |
| **Environmental** | 95 A | **% DER < TER** | | | 47.57 |
| **$CO_2$ Emissions (t/year)** | 0.52 | **DFEE** | 29.40 | **TFEE** | 32.35 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 9.14 |
| **% DPER < TPER** | -5.60 | **DPER** | 55.60 | **TPER** | 52.65 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Chris Collier | **Assessor ID** | T176-0001 |
| **Client** | | | |

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

| | |
|---|---|
| **Orientation** | Northwest |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | Flat, Semi-Detached |
| Position of Flat | Ground-floor flat |
| Which Floor | 0 |
| **2.0 Number of Storeys** | 1 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | Yes |
| Smart gas meter fitted | Yes |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 31.29 m | 112.00 m² | 2.40 m |

**8.0 Living Area** 36.95 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| New External Wall 1 | Cavity Wall | Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure | 0.14 | 60.00 | 75.10 | 58.80 | 0.00 | None | 16.30 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall 1 | Filled Cavity with Edge Sealing | Double plasterboard on both sides, twin timber f rame with/without sheathing board | 0.00 | 20.00 | 29.26 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Wall 1 | Plasterboard on timber frame | 9.00 | 87.40 |

**10.1 Party Ceilings**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Party Ceiling 1 | Timber I-joists, carpeted | 20.00 | 112.00 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Heatloss Floor 1 | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.12 | None | 0.00 | 75.00 | 112.00 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing | Filling | G-value | Frame | Frame | U Value |
|---|---|---|---|---|---|---|---|---|---|

# Summary for Input Data

elmhurst energy

| | | | | Gap | Type | | Type | Factor | (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| Window (new) | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.63 | | 0.70 | 1.10 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Opening | Window (new) | New External Wall 1 | North East | 8.45 | |
| Opening | Window (new) | New External Wall 1 | South West | 7.85 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted Reference: | Imported |
|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 10.80 | 0.30 | 0.30 | Yes |
| E3 Sill | Table K1 - Default | 5.80 | 0.10 | 0.10 | No |
| E4 Jamb | Gov Approved Scheme | 16.40 | 0.01 | 0.01 | Yes |
| E5 Ground floor (normal) | Gov Approved Scheme | 31.29 | 0.11 | 0.11 | Yes |
| E16 Corner (normal) | Gov Approved Scheme | 4.80 | 0.05 | 0.05 | Yes |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | Yes |
| E7 Party floor between dwellings (in blocks of flats) | Gov Approved Scheme | 31.29 | 0.09 | 0.09 | No |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | No |
| P1 Party wall - Ground floor | Gov Approved Scheme | 12.18 | 0.03 | 0.03 | No |
| P3 Party wall - Intermediate floor between dwellings (in blocks of flats) | Table K1 - Default | 12.18 | 0.00 | 0.00 | No |

| | | |
|---|---|---|
| Y-value | 0.07 | W/m²K |

| | | |
|---|---|---|
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 3.00 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | |
|---|---|
| Mechanical Ventilation System Present | Yes |
| Approved Installation | No |
| Mechanical Ventilation data Type | Database |
| Type | Balanced mechanical ventilation with heat recovery |
| MV Reference Number | 500250 |
| Configuration | 2 |
| Manufacturer SFP | 0.54 |
| Duct Type | Rigid |
| MVHR Efficiency | 90.00 |
| Wet Rooms | 2 |
| SFP from Installer Commissioning Certificate | No |
| MVHR System Location | Inside heated envelope (installed exclusively) |
| Duct Installation Specification | Level 2 |

**19.1 Mechanical extract ventilation - Decentralised**

| SFP | Fan/Room Type | Count |
|---|---|---|
| 0.13 | In Room Fan Kitchen | 0 |
| 0.11 | In Room Fan Other Wet Room | 1 |
| 0.00 | In Duct Fan Kitchen | 1 |
| 0.00 | In Duct Fan Other Wet Room | 0 |
| 0.10 | Through Wall Fan Kitchen | 0 |
| 0.10 | Through Wall Fan Other Wet Room | 0 |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | | | | |
|---|---|---|---|---|---|
| No Fixed Lighting | No | | | | |
| | **Name** | **Efficacy** | **Power** | **Capacity** | **Count** |

# Summary for Input Data

| | | | | | |
|---|---|---|---|---|---|
| | Lighting 1 | 90.00 | 10 | 900 | 10 |

| | |
|---|---|
| **24.0 Main Heating 1** | None |
| **25.0 Main Heating 2** | None |
| **26.0 Heat Networks** | Space and Water Combined |
| **Space Community Heating** | |
| Distribution Loss | Calculated |
| Distribution Loss Value | 2.00 |
| SAP Code | 2309 |

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

| | | |
|---|---|---|
| **28.0 Water Heating** | | |
| Water Heating | Community Heating | |
| SAP Code | 901 | |
| Flue Gas Heat Recovery System | No | |
| Waste Water Heat Recovery Instantaneous System 1 | No | |
| Waste Water Heat Recovery Instantaneous System 2 | No | |
| Waste Water Heat Recovery Storage System | No | |
| Solar Panel | No | |
| Water use <= 125 litres/person/day | Yes | |
| Cold Water Source | From mains | |
| Bath Count | 1 | |
| Hot Water Controls Manufacturer | N/A | |
| Hot Water Controls Model | N/A | |
| **28.3 Waste Water Heat Recovery System** | | |
| **29.0 Hot Water Cylinder** | HIU | |
| Loss | 1.46 | kWh/day |
| In Airing Cupboard | No | |
| **34.0 Small-scale Hydro** | None | |

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

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement | |
|---|---|---|---|---|
| | | | SAP rating | Environmental Impact |
| | | | 0 | 0 |
| | | | 0 | 0 |
| | | | 0 | 0 |

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | Flat 2 | **Issued on Date** | 31/01/2023 |
| **Assessment Reference** | Be Lean | **Prop Type Ref** | 2b3p |
| **Property** | Flat 2, 702 Field End Rd, Ruislip , Hillingdon, HA4 0QP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 80 C | **DER** | 5.78 | **TER** | 10.92 |
| **Environmental** | 96 A | **% DER < TER** | | | 47.07 |
| **$CO_2$ Emissions (t/year)** | 0.35 | **DFEE** | 24.04 | **TFEE** | 24.52 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 1.97 |
| **% DPER < TPER** | -7.51 | **DPER** | 61.58 | **TPER** | 57.28 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Chris Collier | **Assessor ID** | T176-0001 |
| **Client** | | | |

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

| | |
|---|---|
| **Orientation** | Southeast |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | Flat, Semi-Detached |
| Position of Flat | Mid-floor flat |
| Which Floor | 1 |
| **2.0 Number of Storeys** | 1 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | Yes |
| Smart gas meter fitted | Yes |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 17.86 m | 66.00 m² | 2.40 m |

**8.0 Living Area** 37.72 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| New External Wall 1 | Cavity Wall | Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure | 0.14 | 60.00 | 42.86 | 30.85 | 0.00 | None | 12.01 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall 1 | Filled Cavity with Edge Sealing | Double plasterboard on both sides, twin timber f rame with/without sheathing board | 0.00 | 20.00 | 42.67 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Wall 1 | Plasterboard on timber frame | 9.00 | 37.44 |

**10.1 Party Ceilings**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Party Ceiling 1 | Timber I-joists, carpeted | 20.00 | 66.00 |

**11.1 Party Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Party Floor 1 | Lowest occupied | Precast concrete planks floor, screed, carpeted | 30.00 | 66.00 |

**12.0 Opening Types**

# Summary for Input Data

elmhurst energy

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| Window (new) | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.63 | | 0.70 | 1.10 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Opening | Window (new) | New External Wall 1 | North West | 1.20 | |
| Opening | Window (new) | New External Wall 1 | North East | 10.81 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted Reference: | Imported |
|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 8.35 | 0.30 | 0.30 | Yes |
| E3 Sill | Table K1 - Default | 5.85 | 0.10 | 0.10 | No |
| E4 Jamb | Gov Approved Scheme | 13.40 | 0.01 | 0.01 | Yes |
| E7 Party floor between dwellings (in blocks of flats) | Gov Approved Scheme | 35.72 | 0.09 | 0.09 | No |
| E16 Corner (normal) | Gov Approved Scheme | 2.40 | 0.05 | 0.05 | No |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | Yes |
| P3 Party wall - Intermediate floor between dwellings (in blocks of flats) | Table K1 - Default | 35.72 | 0.00 | 0.00 | No |

| | | |
|---|---|---|
| Y-value | 0.18 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 3.00 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | |
|---|---|
| Mechanical Ventilation System Present | Yes |
| Approved Installation | No |
| Mechanical Ventilation data Type | Database |
| Type | Balanced mechanical ventilation with heat recovery |
| MV Reference Number | 500250 |
| Configuration | 2 |
| Manufacturer SFP | 0.54 |
| Duct Type | Rigid |
| MVHR Efficiency | 90.00 |
| Wet Rooms | 2 |
| SFP from Installer Commissioning Certificate | No |
| MVHR System Location | Inside heated envelope (installed exclusively) |
| Duct Installation Specification | Level 2 |

**20.0 Fans, Open Fireplaces, Flues**

| | |
|---|---|
| **21.0 Fixed Cooling System** | No |

**22.0 Lighting**

| | |
|---|---|
| No Fixed Lighting | No |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Lighting 1 | 90.00 | 10 | 900 | 10 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | None | |
| **25.0 Main Heating 2** | None | |
| **26.0 Heat Networks** | Space and Water Combined | |

**Space Community Heating**

| | |
|---|---|
| Distribution Loss | Calculated |
| Distribution Loss Value | 2.00 |
| SAP Code | 2309 |

# Summary for Input Data

elmhurst energy

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | | |
|---|---|---|
| Water Heating | Community Heating | |
| SAP Code | 901 | |
| Flue Gas Heat Recovery System | No | |
| Waste Water Heat Recovery Instantaneous System 1 | No | |
| Waste Water Heat Recovery Instantaneous System 2 | No | |
| Waste Water Heat Recovery Storage System | No | |
| Solar Panel | No | |
| Water use <= 125 litres/person/day | Yes | |
| Cold Water Source | From mains | |
| Bath Count | 1 | |
| Hot Water Controls Manufacturer | N/A | |
| Hot Water Controls Model | N/A | |

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | HIU | |
| Loss | 1.46 | kWh/day |
| In Airing Cupboard | No | |

| | | |
|---|---|---|
| **34.0 Small-scale Hydro** | None | |

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

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement | |
|---|---|---|---|---|
| | | | SAP rating | Environmental Impact |
| | | | 0 | 0 |
| | | | 0 | 0 |
| | | | 0 | 0 |

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | Flat 4 | **Issued on Date** | 31/01/2023 |
| **Assessment Reference** | Be Lean | **Prop Type Ref** | 1b2p |
| **Property** | Flat 4, 702 Field End Rd, Ruislip , Hillingdon, HA4 0QP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 77 C | **DER** | 7.26 | **TER** | 14.13 |
| **Environmental** | 95 A | **% DER < TER** | | | 48.62 |
| **$CO_2$ Emissions (t/year)** | 0.34 | **DFEE** | 30.73 | **TFEE** | 32.23 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.68 |
| **% DPER < TPER** | -3.09 | **DPER** | 77.07 | **TPER** | 74.76 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Chris Collier | **Assessor ID** | T176-0001 |
| **Client** | | | |

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

| | |
|---|---|
| **Orientation** | East |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | Flat, Semi-Detached |
| Position of Flat | Top-floor flat |
| Which Floor | 2 |
| **2.0 Number of Storeys** | 1 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | Yes |
| Smart gas meter fitted | Yes |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 14.92 m | 51.00 m² | 2.40 m |

**8.0 Living Area** 30.26 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| New External Wall 1 | Cavity Wall | Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure | 0.14 | 60.00 | 35.81 | 26.96 | 0.00 | None | 8.85 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall 1 | Filled Cavity with Edge Sealing | Double plasterboard on both sides, twin timber f rame with/without sheathing board | 0.00 | 20.00 | 35.81 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Wall 1 | Plasterboard on timber frame | 9.00 | 21.60 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Roof 1 | External Flat Roof | Plasterboard, insulated flat roof | 0.10 | 9.00 | 51.00 | 0.00 | None | 0.00 | Enter Gross Area | 0.00 |

**11.1 Party Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Party Floor 1 | Lowest occupied | Precast concrete planks floor, screed, carpeted | 30.00 | 51.00 |

# Summary for Input Data

elmhurst energy

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| Window (new) | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.63 | | 0.70 | 1.10 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Opening | Window (new) | New External Wall 1 | West | 1.00 | |
| Opening | Window (new) | New External Wall 1 | North | 7.85 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted Reference: | Imported |
|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 6.10 | 0.30 | 0.30 | Yes |
| E3 Sill | Table K1 - Default | 3.60 | 0.10 | 0.10 | No |
| E4 Jamb | Gov Approved Scheme | 10.20 | 0.01 | 0.01 | Yes |
| E7 Party floor between dwellings (in blocks of flats) | Gov Approved Scheme | 14.92 | 0.09 | 0.09 | Yes |
| E14 Flat roof | Table K1 - Default | 14.92 | 0.16 | 0.16 | Yes |
| E16 Corner (normal) | Gov Approved Scheme | 2.40 | 0.05 | 0.05 | No |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | Yes |
| P4 Party wall - Roof (insulation at ceiling level) | Gov Approved Scheme | 14.92 | 0.04 | 0.04 | No |
| P3 Party wall - Intermediate floor between dwellings (in blocks of flats) | Table K1 - Default | 14.92 | 0.00 | 0.00 | No |

| | | |
|---|---|---|
| Y-value | 0.09 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 3.00 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | |
|---|---|
| Mechanical Ventilation System Present | Yes |
| Approved Installation | No |
| Mechanical Ventilation data Type | Database |
| Type | Balanced mechanical ventilation with heat recovery |
| MV Reference Number | 500250 |
| Configuration | 2 |
| Manufacturer SFP | 0.54 |
| Duct Type | Rigid |
| MVHR Efficiency | 90.00 |
| Wet Rooms | 2 |
| SFP from Installer Commissioning Certificate | No |
| MVHR System Location | Inside heated envelope (installed exclusively) |
| Duct Installation Specification | Level 2 |

| | | |
|---|---|---|
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Lighting 1 | 90.00 | 10 | 900 | 10 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | None | |
| **25.0 Main Heating 2** | None | |
| **26.0 Heat Networks** | Space and Water Combined | |
| **Space Community Heating** | | |
| Distribution Loss | Calculated | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Distribution Loss Value | 2.00 |
| SAP Code | 2309 |

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | | |
|---|---|---|
| Water Heating | Community Heating | |
| SAP Code | 901 | |
| Flue Gas Heat Recovery System | No | |
| Waste Water Heat Recovery Instantaneous System 1 | No | |
| Waste Water Heat Recovery Instantaneous System 2 | No | |
| Waste Water Heat Recovery Storage System | No | |
| Solar Panel | No | |
| Water use <= 125 litres/person/day | Yes | |
| Cold Water Source | From mains | |
| Bath Count | 1 | |
| Hot Water Controls Manufacturer | N/A | |
| Hot Water Controls Model | N/A | |

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | HIU | |
| Loss | 1.46 | kWh/day |
| In Airing Cupboard | No | |

| | |
|---|---|
| **34.0 Small-scale Hydro** | None |

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

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement | |
|---|---|---|---|---|
| | | | SAP rating | Environmental Impact |
| | | | 0 | 0 |
| | | | 0 | 0 |
| | | | 0 | 0 |

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | Flat 1 | **Issued on Date** | 01/02/2023 |
| **Assessment Reference** | Be Green 2 | **Prop Type Ref** | 3b6p |
| **Property** | Flat 1, 702 Field End Rd, Ruislip , Hillingdon, HA4 0QP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 3.37 | **TER** | 10.07 |
| **Environmental** | 97 A | **% DER < TER** | | | 66.53 |
| **$CO_2$ Emissions (t/year)** | 0.34 | **DFEE** | 29.40 | **TFEE** | 32.35 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 9.14 |
| **% DPER < TPER** | 32.39 | **DPER** | 35.60 | **TPER** | 52.65 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Chris Collier | **Assessor ID** | T176-0001 |
| **Client** | | | |

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

| | |
|---|---|
| **Orientation** | Northwest |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | Flat, Semi-Detached |
| Position of Flat | Ground-floor flat |
| Which Floor | 0 |
| **2.0 Number of Storeys** | 1 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | Yes |
| Smart gas meter fitted | Yes |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 31.29 m | 112.00 m² | 2.40 m |

**8.0 Living Area** 36.95 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| New External Wall 1 | Cavity Wall | Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure | 0.14 | 60.00 | 75.10 | 58.80 | 0.00 | None | 16.30 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall 1 | Filled Cavity with Edge Sealing | Double plasterboard on both sides, twin timber f rame with/without sheathing board | 0.00 | 20.00 | 29.26 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Wall 1 | Plasterboard on timber frame | 9.00 | 87.40 |

**10.1 Party Ceilings**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Party Ceiling 1 | Timber I-joists, carpeted | 20.00 | 112.00 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Heatloss Floor 1 | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.12 | None | 0.00 | 75.00 | 112.00 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing | Filling | G-value | Frame | Frame | U Value |
|---|---|---|---|---|---|---|---|---|---|

# Summary for Input Data

elmhurst energy

| | | | | Gap | Type | | Type | Factor | (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| Window (new) | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.63 | | 0.70 | 1.10 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Opening | Window (new) | New External Wall 1 | North East | 8.45 | |
| Opening | Window (new) | New External Wall 1 | South West | 7.85 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted Reference: | Imported |
|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 10.80 | 0.30 | 0.30 | Yes |
| E3 Sill | Table K1 - Default | 5.80 | 0.10 | 0.10 | No |
| E4 Jamb | Gov Approved Scheme | 16.40 | 0.01 | 0.01 | Yes |
| E5 Ground floor (normal) | Gov Approved Scheme | 31.29 | 0.11 | 0.11 | Yes |
| E16 Corner (normal) | Gov Approved Scheme | 4.80 | 0.05 | 0.05 | Yes |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | Yes |
| E7 Party floor between dwellings (in blocks of flats) | Gov Approved Scheme | 31.29 | 0.09 | 0.09 | No |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | No |
| P1 Party wall - Ground floor | Gov Approved Scheme | 12.18 | 0.03 | 0.03 | No |
| P3 Party wall - Intermediate floor between dwellings (in blocks of flats) | Table K1 - Default | 12.18 | 0.00 | 0.00 | No |

| | | |
|---|---|---|
| Y-value | 0.07 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 3.00 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | |
|---|---|
| Mechanical Ventilation System Present | Yes |
| Approved Installation | No |
| Mechanical Ventilation data Type | Database |
| Type | Balanced mechanical ventilation with heat recovery |
| MV Reference Number | 500250 |
| Configuration | 2 |
| Manufacturer SFP | 0.54 |
| Duct Type | Rigid |
| MVHR Efficiency | 90.00 |
| Wet Rooms | 2 |
| SFP from Installer Commissioning Certificate | No |
| MVHR System Location | Inside heated envelope (installed exclusively) |
| Duct Installation Specification | Level 2 |

**19.1 Mechanical extract ventilation - Decentralised**

| SFP | Fan/Room Type | Count |
|---|---|---|
| 0.13 | In Room Fan Kitchen | 0 |
| 0.11 | In Room Fan Other Wet Room | 1 |
| 0.00 | In Duct Fan Kitchen | 1 |
| 0.00 | In Duct Fan Other Wet Room | 0 |
| 0.10 | Through Wall Fan Kitchen | 0 |
| 0.10 | Through Wall Fan Other Wet Room | 0 |

**20.0 Fans, Open Fireplaces, Flues**

| | |
|---|---|
| **21.0 Fixed Cooling System** | No |

**22.0 Lighting**

| | | | | | |
|---|---|---|---|---|---|
| No Fixed Lighting | No | | | | |
| | **Name** | **Efficacy** | **Power** | **Capacity** | **Count** |

# Summary for Input Data

elmhurst energy

| | | | | | |
|---|---|---|---|---|---|
| | Lighting 1 | 90.00 | 10 | 900 | 10 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Heat pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 103892 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | AERONA3 | |
| Manufacturer | Grant Engineering (UK) Ltd | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |
| Is MHS Pumped | Pump in heated space | |
| Heating Pump Age | 2013 or later | |
| Heat Emitter | Underfloor | |
| Underfloor Heating | Yes - Pipes in thin screed | |
| Flow Temperature | Enter value | |
| Flow Temperature Value | 35.00 | |
| **25.0 Main Heating 2** | None | |
| **26.0 Heat Networks** | None | |

**Space Community Heating**

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

| | | |
|---|---|---|
| **28.0 Water Heating** | | |
| Water Heating | Main Heating 1 | |
| SAP Code | 901 | |
| Flue Gas Heat Recovery System | No | |
| Waste Water Heat Recovery Instantaneous System 1 | No | |
| Waste Water Heat Recovery Instantaneous System 2 | No | |
| Waste Water Heat Recovery Storage System | No | |
| Solar Panel | No | |
| Water use <= 125 litres/person/day | Yes | |
| Cold Water Source | From mains | |
| Bath Count | 1 | |
| Immersion Only Heating Hot Water | No | |
| Hot Water Controls Manufacturer | N/A | |
| Hot Water Controls Model | N/A | |
| **28.3 Waste Water Heat Recovery System** | | |
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 150.00 | L |
| Loss | 1.40 | kWh/day |

# Summary for Input Data

| | |
|---|---|
| Pipes insulation | Fully insulated primary pipework |
| In Airing Cupboard | No |
| **31.0 Thermal Store** | None |
| **34.0 Small-scale Hydro** | None |

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

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement | |
|---|---|---|---|---|
| | | | SAP rating | Environmental Impact |
| | | | 0 | 0 |
| | | | 0 | 0 |
| | | | 0 | 0 |

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | Flat 2 | **Issued on Date** | 01/02/2023 |
| **Assessment Reference** | Be Green 2 | **Prop Type Ref** | 2b3p |
| **Property** | Flat 2, 702 Field End Rd, Ruislip , Hillingdon, HA4 0QP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 80 C | **DER** | 5.15 | **TER** | 10.92 |
| **Environmental** | 96 A | **% DER < TER** | | | 52.84 |
| **$CO_2$ Emissions (t/year)** | 0.32 | **DFEE** | 24.04 | **TFEE** | 24.52 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 1.97 |
| **% DPER < TPER** | 4.40 | **DPER** | 54.76 | **TPER** | 57.28 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Chris Collier | **Assessor ID** | T176-0001 |
| **Client** | | | |

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

| | |
|---|---|
| **Orientation** | Southeast |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | Flat, Semi-Detached |
| Position of Flat | Mid-floor flat |
| Which Floor | 1 |
| **2.0 Number of Storeys** | 1 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | Yes |
| Smart gas meter fitted | Yes |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 17.86 m | 66.00 m² | 2.40 m |

**8.0 Living Area** 37.72 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| New External Wall 1 | Cavity Wall | Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure | 0.14 | 60.00 | 42.86 | 30.85 | 0.00 | None | 12.01 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall 1 | Filled Cavity with Edge Sealing | Double plasterboard on both sides, twin timber f rame with/without sheathing board | 0.00 | 20.00 | 42.67 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Wall 1 | Plasterboard on timber frame | 9.00 | 37.44 |

**10.1 Party Ceilings**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Party Ceiling 1 | Timber I-joists, carpeted | 20.00 | 66.00 |

**11.1 Party Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Party Floor 1 | Lowest occupied | Precast concrete planks floor, screed, carpeted | 30.00 | 66.00 |

**12.0 Opening Types**

# Summary for Input Data

elmhurst energy

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| Window (new) | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.63 | | 0.70 | 1.10 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Opening | Window (new) | New External Wall 1 | North West | 1.20 | |
| Opening | Window (new) | New External Wall 1 | North East | 10.81 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted Reference: | Imported |
|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 8.35 | 0.30 | 0.30 | Yes |
| E3 Sill | Table K1 - Default | 5.85 | 0.10 | 0.10 | No |
| E4 Jamb | Gov Approved Scheme | 13.40 | 0.01 | 0.01 | Yes |
| E7 Party floor between dwellings (in blocks of flats) | Gov Approved Scheme | 35.72 | 0.09 | 0.09 | No |
| E16 Corner (normal) | Gov Approved Scheme | 2.40 | 0.05 | 0.05 | No |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | Yes |
| P3 Party wall - Intermediate floor between dwellings (in blocks of flats) | Table K1 - Default | 35.72 | 0.00 | 0.00 | No |

| | | |
|---|---|---|
| Y-value | 0.18 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 3.00 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | |
|---|---|
| Mechanical Ventilation System Present | Yes |
| Approved Installation | No |
| Mechanical Ventilation data Type | Database |
| Type | Balanced mechanical ventilation with heat recovery |
| MV Reference Number | 500250 |
| Configuration | 2 |
| Manufacturer SFP | 0.54 |
| Duct Type | Rigid |
| MVHR Efficiency | 90.00 |
| Wet Rooms | 2 |
| SFP from Installer Commissioning Certificate | No |
| MVHR System Location | Inside heated envelope (installed exclusively) |
| Duct Installation Specification | Level 2 |

**20.0 Fans, Open Fireplaces, Flues**

| | |
|---|---|
| **21.0 Fixed Cooling System** | No |

**22.0 Lighting**

| | |
|---|---|
| No Fixed Lighting | No |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Lighting 1 | 90.00 | 10 | 900 | 10 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 103892 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |

# Summary for Input Data

elmhurst energy

| | | |
|---|---|---|
| Model Name | AERONA3 | |
| Manufacturer | Grant Engineering (UK) Ltd | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |
| Is MHS Pumped | Pump in heated space | |
| Heating Pump Age | 2013 or later | |
| Heat Emitter | Underfloor | |
| Underfloor Heating | Yes - Pipes in thin screed | |
| Flow Temperature | Enter value | |
| Flow Temperature Value | 35.00 | |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

**Space Community Heating**

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

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

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 150.00 | L |
| Loss | 1.40 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**34.0 Small-scale Hydro** — None

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

**Recommendations**

**Lower cost measures**

**None**

# Summary for Input Data

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement | |
|---|---|---|---|---|
| | | | SAP rating | Environmental Impact |
| | | | 0 | 0 |
| | | | 0 | 0 |
| | | | 0 | 0 |

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | Flat 4 | **Issued on Date** | 01/02/2023 |
| **Assessment Reference** | Be Green 2 | **Prop Type Ref** | 1b2p |
| **Property** | Flat 4, 702 Field End Rd, Ruislip , Hillingdon, HA4 0QP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 76 C | **DER** | 6.92 | **TER** | 14.13 |
| **Environmental** | 95 A | **% DER < TER** | | | 51.03 |
| **$CO_2$ Emissions (t/year)** | 0.33 | **DFEE** | 30.73 | **TFEE** | 32.23 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.68 |
| **% DPER < TPER** | 1.71 | **DPER** | 73.48 | **TPER** | 74.76 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Chris Collier | **Assessor ID** | T176-0001 |
| **Client** | | | |

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

| | |
|---|---|
| **Orientation** | East |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | Flat, Semi-Detached |
| Position of Flat | Top-floor flat |
| Which Floor | 2 |
| **2.0 Number of Storeys** | 1 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | Yes |
| Smart gas meter fitted | Yes |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 14.92 m | 51.00 m² | 2.40 m |

**8.0 Living Area** 30.26 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| New External Wall 1 | Cavity Wall | Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure | 0.14 | 60.00 | 35.81 | 26.96 | 0.00 | None | 8.85 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall 1 | Filled Cavity with Edge Sealing | Double plasterboard on both sides, twin timber f rame with/without sheathing board | 0.00 | 20.00 | 35.81 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Wall 1 | Plasterboard on timber frame | 9.00 | 21.60 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Roof 1 | External Flat Roof | Plasterboard, insulated flat roof | 0.10 | 9.00 | 51.00 | 0.00 | None | 0.00 | Enter Gross Area | 0.00 |

**11.1 Party Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Party Floor 1 | Lowest occupied | Precast concrete planks floor, screed, carpeted | 30.00 | 51.00 |

# Summary for Input Data

elmhurst energy

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| Window (new) | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.63 | | 0.70 | 1.10 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Opening | Window (new) | New External Wall 1 | West | 1.00 | |
| Opening | Window (new) | New External Wall 1 | North | 7.85 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted Reference: | Imported |
|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 6.10 | 0.30 | 0.30 | Yes |
| E3 Sill | Table K1 - Default | 3.60 | 0.10 | 0.10 | No |
| E4 Jamb | Gov Approved Scheme | 10.20 | 0.01 | 0.01 | Yes |
| E7 Party floor between dwellings (in blocks of flats) | Gov Approved Scheme | 14.92 | 0.09 | 0.09 | Yes |
| E14 Flat roof | Table K1 - Default | 14.92 | 0.16 | 0.16 | Yes |
| E16 Corner (normal) | Gov Approved Scheme | 2.40 | 0.05 | 0.05 | No |
| E18 Party wall between dwellings | Table K1 - Default | 4.80 | 0.24 | 0.24 | Yes |
| P4 Party wall - Roof (insulation at ceiling level) | Gov Approved Scheme | 14.92 | 0.04 | 0.04 | No |
| P3 Party wall - Intermediate floor between dwellings (in blocks of flats) | Table K1 - Default | 14.92 | 0.00 | 0.00 | No |

| | | |
|---|---|---|
| Y-value | 0.09 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 3.00 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | Yes | |
| Approved Installation | No | |
| Mechanical Ventilation data Type | Database | |
| Type | Balanced mechanical ventilation with heat recovery | |
| MV Reference Number | 500250 | |
| Configuration | 2 | |
| Manufacturer SFP | 0.54 | |
| Duct Type | Rigid | |
| MVHR Efficiency | 90.00 | |
| Wet Rooms | 2 | |
| SFP from Installer Commissioning Certificate | No | |
| MVHR System Location | Inside heated envelope (installed exclusively) | |
| Duct Installation Specification | Level 2 | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Lighting 1 | 90.00 | 10 | 900 | 10 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 103892 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |

| | |
|---|---|
| In Summer | 0.00 |
| Model Name | AERONA3 |
| Manufacturer | Grant Engineering (UK) Ltd |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Underfloor |
| Underfloor Heating | Yes - Pipes in thin screed |
| Flow Temperature | Enter value |
| Flow Temperature Value | 35.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

**Space Community Heating**

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

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

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 150.00 | L |
| Loss | 1.40 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**34.0 Small-scale Hydro** — None

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

**Recommendations**

# Summary for Input Data

**Lower cost measures**

None

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement | |
|---|---|---|---|---|
| | | | SAP rating | Environmental Impact |
| | | | 0 | 0 |
| | | | 0 | 0 |
| | | | 0 | 0 |

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

**Project name**

## COMMERCIAL UNIT - BE LEAN

As designed

**Date:** Wed Feb 01 18:44:20 2023

## Administrative information

### Building Details

**Address:** Addison Estate, 702 Field End Road, Ruislip, HA4 0QP

### Certifier details

**Name:** Chris Collier

**Telephone number:**

**Address:** , ,

### Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.b.0

**Interface to calculation engine:** Virtual Environment

**Interface to calculation engine version:** v7.0.15

**BRUKL compliance check version:** v6.1.b.0

**Foundation area [$m^2$]:** 574

## The $CO_2$ emission and primary energy rates of the building must not exceed the targets

| | | |
|---|---|---|
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 3.62 | |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 3.13 | |
| Target primary energy rate (TPER), $kWh/m^2.annum$ | 38.26 | |
| Building primary energy rate (BPER), $kWh/m^2.annum$ | 33.6 | |
| Do the building's emission and primary energy rates exceed the targets? | BER =< TER | BPER =< TPER |

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

| Fabric element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | First surface with maximum value |
|---|---|---|---|---|
| Walls* | 0.26 | 0.26 | 0.26 | RM000000_W-1 |
| Floors | 0.18 | 0.15 | 0.15 | RM000000_F |
| Pitched roofs | 0.16 | - | - | No heat loss pitched roofs |
| Flat roofs | 0.18 | 0.18 | 0.18 | RM000000_C |
| Windows** and roof windows | 1.6 | 1.6 | 1.6 | RM000001_W-1_O0 |
| Rooflights*** | 2.2 | - | - | No external rooflights |
| Personnel doors^ | 1.6 | 1.6 | 1.6 | RM000000_W-1_O0 |
| Vehicle access & similar large doors | 1.3 | 1.3 | 1.3 | RM000000_W-1_O1 |
| High usage entrance doors | 3 | - | - | No external high usage entrance doors |

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 $W/m^2K$

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 | Limiting standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 8 | 8 |

### Building services

**For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.**

| | |
|---|---|
| **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- Main system

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 2.69 | 5.89 | - | - | - |
| **Standard value** | 2.5* | 5 | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. | | | | | |

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| | **Water heating efficiency** | **Storage loss factor [kWh/litre per day]** |
|---|---|---|
| **This building** | 1 | - |
| **Standard value** | 1 | N/A |

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

| **General lighting and display lighting** | **General luminaire** | **Display light source** | |
|---|---|---|---|
| **Zone name** | **Efficacy [lm/W]** | **Efficacy [lm/W]** | **Power density [W/m²]** |
| **Standard value** | 95 | 80 | 0.3 |
| Room 001 | 95 | - | - |
| Room 002 | 95 | - | - |
| Room 003 | 95 | - | - |

## The spaces in the building should have appropriate passive control measures to limit solar gains in summer

| **Zone** | **Solar gain limit exceeded? (%)** | **Internal blinds used?** |
|---|---|---|
| Room 001 | N/A | N/A |
| Room 002 | NO (-89.4%) | NO |
| Room 003 | NO (-70.2%) | NO |

## Regulation 25A: Consideration of high efficiency alternative energy systems

| | |
|---|---|
| **Were alternative energy systems considered and analysed as part of the design process?** | YES |
| Is evidence of such assessment available as a separate submission? | YES |
| Are any such measures included in the proposed design? | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Floor area [$m^2$] | 1722 | 1722 |
| External area [$m^2$] | 2264.8 | 2264.8 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 8 | 5 |
| Average conductance [W/K] | 602.62 | 770.45 |
| Average U-value [$W/m^2K$] | 0.27 | 0.34 |
| Alpha value* [%] | 25.56 | 65.45 |

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

## Building Use

| % Area | Building Type |
|---|---|
| | Retail/Financial and Professional Services |
| | Restaurants and Cafes/Drinking Establishments/Takeaways |
| | Offices and Workshop Businesses |
| | General Industrial and Special Industrial Groups |
| **100** | **Storage or Distribution** |
| | Hotels |
| | Residential Institutions: Hospitals and Care Homes |
| | Residential Institutions: Residential Schools |
| | Residential Institutions: Universities and Colleges |
| | Secure Residential Institutions |
| | Residential Spaces |
| | Non-residential Institutions: Community/Day Centre |
| | Non-residential Institutions: Libraries, Museums, and Galleries |
| | Non-residential Institutions: Education |
| | Non-residential Institutions: Primary Health Care Building |
| | Non-residential Institutions: Crown and County Courts |
| | 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 [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Heating | 6.41 | 11.81 |
| Cooling | 2.82 | 3.3 |
| Auxiliary | 0 | 0 |
| Lighting | 8.55 | 6.17 |
| Hot water | 4.24 | 4.24 |
| Equipment* | 29.87 | 29.87 |
| **TOTAL**** | **22.02** | **25.52** |

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

## Energy Production by Technology [$kWh/m^2$]

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

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 105.53 | 164.51 |
| Primary energy [$kWh/m^2$] | 33.6 | 38.26 |
| Total emissions [$kg/m^2$] | 3.13 | 3.62 |

## HVAC Systems Performance

| System Type | | Heat dem MJ/m2 | Cool dem MJ/m2 | Heat con kWh/m2 | Cool con kWh/m2 | Aux con kWh/m2 | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
|---|---|---|---|---|---|---|---|---|---|---|
| **[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 60.9 | 44.7 | 6.4 | 2.8 | 0 | 2.64 | 4.4 | 2.69 | 5.89 |
| | **Notional** | 112.2 | 52.3 | 11.8 | 3.3 | 0 | 2.64 | 4.4 | ---- | ---- |

### 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

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

**Project name**

## COMMERCIAL UNIT - BE GREEN

As designed

**Date:** Tue Jan 31 17:15:19 2023

## Administrative information

### Building Details

**Address:** Addison Estate, 702 Field End Road, Ruislip, HA4 0QP

### Certifier details

**Name:** Chris Collier

**Telephone number:**

**Address:** , ,

### Certification tool

**Calculation engine:** SBEM

**Calculation engine version:** v6.1.b.0

**Interface to calculation engine:** Virtual Environment

**Interface to calculation engine version:** v7.0.15

**BRUKL compliance check version:** v6.1.b.0

**Foundation area [$m^2$]:** 574

## The $CO_2$ emission and primary energy rates of the building must not exceed the targets

| | | |
|---|---|---|
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 3.62 | |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 2.32 | |
| Target primary energy rate (TPER), $kWh/m^2.annum$ | 38.26 | |
| Building primary energy rate (BPER), $kWh/m^2.annum$ | 24.63 | |
| Do the building's emission and primary energy rates exceed the targets? | BER =< TER | BPER =< TPER |

## The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

| Fabric element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | First surface with maximum value |
|---|---|---|---|---|
| Walls* | 0.26 | 0.26 | 0.26 | RM000000_W-1 |
| Floors | 0.18 | 0.15 | 0.15 | RM000000_F |
| Pitched roofs | 0.16 | - | - | No heat loss pitched roofs |
| Flat roofs | 0.18 | 0.18 | 0.18 | RM000000_C |
| Windows** and roof windows | 1.6 | 1.6 | 1.6 | RM000001_W-1_O0 |
| Rooflights*** | 2.2 | - | - | No external rooflights |
| Personnel doors^ | 1.6 | 1.6 | 1.6 | RM000000_W-1_O0 |
| Vehicle access & similar large doors | 1.3 | 1.3 | 1.3 | RM000000_W-1_O1 |
| High usage entrance doors | 3 | - | - | No external high usage entrance doors |

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* 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. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 $W/m^2K$

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 | Limiting standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 8 | 8 |

### Building services

**For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.**

| | |
|---|---|
| **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- Main system

| | **Heating efficiency** | **Cooling efficiency** | **Radiant efficiency** | **SFP [W/(l/s)]** | **HR efficiency** |
|---|---|---|---|---|---|
| **This system** | 3.6 | 5 | - | - | - |
| **Standard value** | 2.5* | 5 | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | YES |
| * Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. | | | | | |

1- SYST0000-DHW

| | **Water heating efficiency** | **Storage loss factor [kWh/litre per day]** |
|---|---|---|
| **This building** | 1 | - |
| **Standard value** | 1 | N/A |

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

| **General lighting and display lighting** | **General luminaire** | **Display light source** | |
|---|---|---|---|
| **Zone name** | **Efficacy [lm/W]** | **Efficacy [lm/W]** | **Power density [W/m²]** |
| **Standard value** | 95 | 80 | 0.3 |
| Room 001 | 95 | - | - |
| Room 002 | 95 | - | - |
| Room 003 | 95 | - | - |

## The spaces in the building should have appropriate passive control measures to limit solar gains in summer

| **Zone** | **Solar gain limit exceeded? (%)** | **Internal blinds used?** |
|---|---|---|
| Room 001 | N/A | N/A |
| Room 002 | NO (-89.4%) | NO |
| Room 003 | NO (-70.2%) | NO |

## Regulation 25A: Consideration of high efficiency alternative energy systems

| | |
|---|---|
| **Were alternative energy systems considered and analysed as part of the design process?** | YES |
| Is evidence of such assessment available as a separate submission? | YES |
| Are any such measures included in the proposed design? | YES |

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Floor area [$m^2$] | 1722 | 1722 |
| External area [$m^2$] | 2264.8 | 2264.8 |
| Weather | LON | LON |
| Infiltration [$m^3/hm^2$@ 50Pa] | 8 | 5 |
| Average conductance [W/K] | 602.62 | 770.45 |
| Average U-value [$W/m^2K$] | 0.27 | 0.34 |
| Alpha value* [%] | 25.56 | 65.45 |

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

## Building Use

| % Area | Building Type |
|---|---|
| | Retail/Financial and Professional Services |
| | Restaurants and Cafes/Drinking Establishments/Takeaways |
| | Offices and Workshop Businesses |
| | General Industrial and Special Industrial Groups |
| **100** | **Storage or Distribution** |
| | Hotels |
| | Residential Institutions: Hospitals and Care Homes |
| | Residential Institutions: Residential Schools |
| | Residential Institutions: Universities and Colleges |
| | Secure Residential Institutions |
| | Residential Spaces |
| | Non-residential Institutions: Community/Day Centre |
| | Non-residential Institutions: Libraries, Museums, and Galleries |
| | Non-residential Institutions: Education |
| | Non-residential Institutions: Primary Health Care Building |
| | Non-residential Institutions: Crown and County Courts |
| | 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 [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Heating | 4.79 | 11.81 |
| Cooling | 3.32 | 3.3 |
| Auxiliary | 0 | 0 |
| Lighting | 8.55 | 6.17 |
| Hot water | 4.24 | 4.24 |
| Equipment* | 29.87 | 29.87 |
| **TOTAL**** | **20.9** | **25.52** |

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

## Energy Production by Technology [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Photovoltaic systems | 4.84 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0 | 0 |
| *Displaced electricity* | *4.84* | *0* |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 105.53 | 164.51 |
| Primary energy [$kWh/m^2$] | 24.63 | 38.26 |
| Total emissions [$kg/m^2$] | 2.32 | 3.62 |

## HVAC Systems Performance

| System Type | | Heat dem MJ/m2 | Cool dem MJ/m2 | Heat con kWh/m2 | Cool con kWh/m2 | Aux con kWh/m2 | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
|---|---|---|---|---|---|---|---|---|---|---|
| **[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 60.9 | 44.7 | 4.8 | 3.3 | 0 | 3.53 | 3.74 | 3.6 | 5 |
| | **Notional** | 112.2 | 52.3 | 11.8 | 3.3 | 0 | 2.64 | 4.4 | ---- | ---- |

## Key to terms

Heat dem [MJ/m2] = Heating energy demand
Cool dem [MJ/m2] = Cooling energy demand
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