



Goldsmith Mews

Energy Statement

July 2022

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DOCUMENT CONTROL SHEET

Report Reference	CBE1975/ES/202207-NR
Revision	-
Issue Purpose	Planning Condition
Report Prepared for:	Stem Homes Ltd
Author	Neil Rothern
Approved By	Ed Coate
Date of Issue	4 th July 2022

DISCLAIMER

This Report has been produced to support a Planning Application and is not to be used 'For Construction', for Building Control compliance or for a Planning Condition on an approved scheme.

The information contained within this Report is based on Drawings and Specifications provided by the Design Team along with information assumed by NRG Consulting for the purposes of compliance where no other information was available. Any budget costs or plant sizing contained within this document are based upon available information and are to be taken as an estimation and guideline only.

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1. EXECUTIVE SUMMARY

- 1.1 NRG Consulting have been appointed to undertake an Energy Statement on a proposed development at Goldsmith Mews, Garages to the rear of Osney Way Car Park, Lower Higham Road, Gravesend, Kent, DA12 2ND. The application reference is 20211415
- 1.2 The proposed scheme is for the; *demolition of 14 existing lock-up garages and the erection of 4no. three-storey terraced homes, with associated parking, gardens, access, refuse and bike storage, and boundary treatments.*
- 1.3 This document is clear Condition 14 which states:
- Notwithstanding the details shown in the approved drawings or other supporting documents, full details of the sustainability measures to be incorporated in the development hereby permitted (including in terms of renewable and low carbon energy and water supply and efficiency) shall be submitted for the approval of the Local Planning Authority before the commencement of any above ground works; the development shall be carried out in accordance with the approved details before the first occupation of any part of the development.*
- 1.4 This document illustrates a reduction of 39.63% in CO₂ emissions over that of the baseline (TER) of Part L via:

“Energy Efficiency Measures”

- U-Values are at least 50% better than the Part L limiting parameters.
- Air Permeability 50% better than the Part L limiting parameter.
- 100% low energy lighting

“Decentralised Energy”

- Following a review of the scheme, there are no current or proposed decentralised energy networks present in the area.

“Renewable Energy”

- Air Source Heat Pumps (Mitsubishi) will be installed to each dwelling

	Regulated Carbon Dioxide Savings	
	CO ₂ emissions (tonnes/CO ₂ /year)	Site-Wide % Saving in CO ₂ emissions
Baseline: Part L 2013 of the Building Regulations	10.75	
Savings from Energy Demand Reduction	6.49	39.63%

Table 1: Final Carbon Emission Table

2. POLICY FRAMEWORK

- 2.1 The proposed development falls within the Government's "minor" category of planning applications.

KEY POLICIES AND REFERENCE DOCUMENT SUMMARY

This document has been produced to satisfy and written in adherence too:

NATIONAL PLANNING POLICY FRAMEWORK (JULY 2021)

14. Meeting the challenge of climate change, flooding, and coastal change

155. To help increase the use and supply of renewable and low carbon energy and heat, plans should:

a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);

b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

c) identify opportunities for development to draw its energy supply from decentralised, renewable, or low carbon energy supply systems and for collocating potential heat customers and suppliers.

157. In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing, and landscaping to minimise energy consumption.

158. When determining planning applications for renewable and low carbon development, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and

b) approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

LOCAL POLICIES

Gravesham Borough Council (Adopted September 2014)

Policy CS01 – Sustainable Development

The Council will support Neighbourhood Plans in identifying suitable areas for renewable and low carbon energy development.

Renewable and low carbon energy schemes, including wind energy schemes, will be permitted where the proposal is in a suitable area for renewable and low carbon energy as identified in a Neighbourhood Plan.

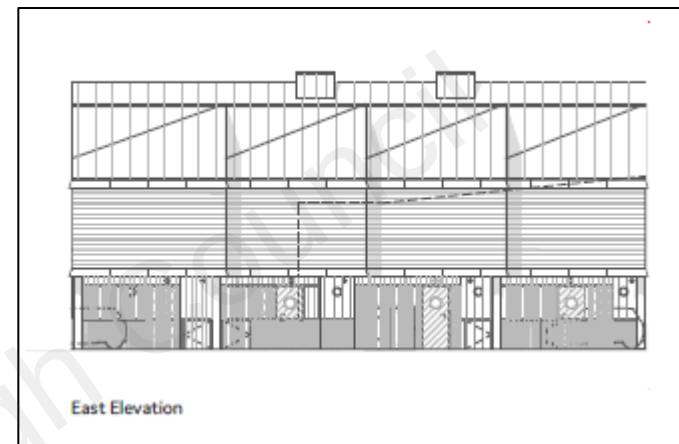
Renewable and low carbon energy schemes, with the exception of wind energy schemes, will also be permitted where there are no significant adverse effects on the amenities of nearby properties or businesses, there are no adverse safety impacts and no significant adverse effects on the transport network.

Cumulative effects and the impact of ancillary infrastructure will form part of the assessment for planning applications for renewable and low carbon energy developments.

When the technology is no longer operational there is a requirement to decommission, remove the facility and complete a restoration of the site to its original condition.

CS18: Climate Change

Flood Risk: development directed sequentially to areas at least risk of flooding. Proposals at risk of flooding must be accompanied by Flood Risk Assessment and Flood Risk Management Plan (if required). Permission refused if sequential and exception tests fail. Prioritise maintenance, improvement or replacement of flood defence infrastructure over other land uses. New development to reduce the causes and impacts of flooding. Water Quality: regard to Water Framework Directive and Thames River Basin Management Plan objectives. Sustainable Drainage and Surface Water Run-Off: • surface water run-off from new development no greater impact than existing use; and * use of Sustainable Drainage Systems. Water Demand Management: Manage supply of water and reduce impact of development on water supply: * Require new homes to be built to at least level 3/4 of the Code for Sustainable Homes in terms of water use (105 litres per person per day consumption) or by compensatory water savings. * Seek 5% of homes on Key Sites to meet level 5/6 of the Code for Sustainable Homes ref. water use (80 litres/person/day consumption); * Require all nonresidential developments of 1,000 m² and above to meet the BREEAM "excellent" standards of water efficiency and include collection of rainwater; and * Support retrofitting existing residential properties to reduce water consumption. Carbon Reduction: reduce carbon footprint of Borough by: * national policy on transition to zero carbon development via amendments to Part L of the Building Regulations, require development to include low carbon and renewable energy generation inc. combined heat and power unless not technically or financially feasible or are alternative solutions; * Support stand-alone decentralised, renewable or low carbon energy development; and * Support other proposals which lead to a reduction in carbon footprint e.g. retrofitting existing homes.



3. ENERGY CALCULATIONS

3.1 In order to estimate the predicted energy demand and regulated CO₂ emissions for the site, sample SAP Calculations have been carried out by a licensed OCDEA (SAP) Assessor using Elmhurst Design SAP 2012.

3.2 The baseline CO₂ emissions covered by Part L 2013 of the Building Regulations will be expressed as the Target Emissions Rate (TER), obtained from the SAP calculations. SAP Calculations cover regulated energy use that comprises of:

- Heating - Hot Water
- Lighting - Pumps and Fans

PASSIVE DESIGN

The design of the development prioritises passive measures to minimise heat loss. The U-values and the air permeability rate have been selected to exceed the minimum requirements of the Building Regulation and the development will incorporate efficient building services to limit carbon emissions, including a NO_x-free heating system and low energy lighting.

The proposed building services are compliant with the recommendations of the Domestic Building Services Compliance Guide (2013).

3.3 Passive design measures utilised by the architect in the concept and development of the scheme design include:

- Optimising orientation and site layout to reduce energy demand
- Provision of cross-ventilation
- Maximising thermal mass where possible to reduce internal temperature variation (through use of traditional construction to residential dwellings)
- High performance glazing system to reduce heat demand and increase solar gains

ELEMENT	PART L1A LIMITING FABRIC PARAMETERS	PROPOSED U-VALUES (W/m ² K)
Walls		
External Wall E1	0.3 W/m ² K	0.19 W/m ² K
External Wall E2	0.3 W/m ² K	0.24 W/m ² K
Party Wall	0.2 W/m ² K	0 W/m ² K
Floors		
Ground Floor	0.25 W/m ² K	0.09 W/m ² K
Roof		
Roof	0.2 W/m ² K	0.12 W/m ² K
Openings		
Windows	2.2 W/m ² K	1.4 W/m ² K
Front Door (Houses)	2.2 W/m ² K	1.4 W/m ² K
Thermal Bridging		
Accredited Construction Details		

Table 2: Proposed Fabric Specification

ELEMENT	PROPOSED DETAILS
Air Permeability	5 m ³ /(hm ²) @50Pa
Ventilation	System 1 – Natural
Heating	Individual Heating – Air Source Heat Pumps
Heating Details	Mitsubishi Ecodan 8.5 kW
Hot Water	200L Cylinder
Heating Control	Time and Temperature Zone Control
Emitters	Underfloor
Lighting	100% Low Energy

Table 3: Proposed Mechanical and Electrical Specification

4. RENEWABLE ENERGY

- 4.1 In order to achieve an improved CO₂ reduction, the implementation of low carbon or renewable technology will be implemented.
- 4.2 For this scheme, and based on recent legislation such as the Clean Air Act, the following technologies have been automatically discounted:
- Wind Turbines - Biomass
 - Hydropower / Wave Technology - Biogas / Biofuel
- 4.3 The feasibility of remaining renewable and low carbon technologies is highlighted below. Following this review, Air Source Heat Pumps have been chosen as the most suited technology for the scheme.

- 4.4 To provide renewable heating and hot water, Air Source Heat Pumps are proposed. An ASHP extracts heat from ambient air via a heat exchanger and raises the temperature of an internal refrigerant via the compression cycle.

Air Source Heat Pump Details	
Areas to be Heated	All dwellings
Heating Efficiencies (COP)	2.8
Fraction of Heat from ASHP	100%

Table 4: Proposed details of ASHP use

Technology	Feasibility					Overall Feasibility
	Cost	Noise	Land Use	Tariffs	CO ₂ Offset	
Photovoltaic Panels (PV)	✓	✓	✓	✗	✗	
Air Source Heat Pumps	✓	✓	✓	✓	✓	
Ground Source Heat Pumps	✗	✓	✗	✓	✓	
Solar Thermal	✓	✓	✗	✓	✗	

- 4.5 A single Air Source Heat Pump will be provided to each dwelling. This will consist of an internal unit and an external unit and the design will be in-line with the schematic below which shows a typical ASHP installation to a new build dwelling.

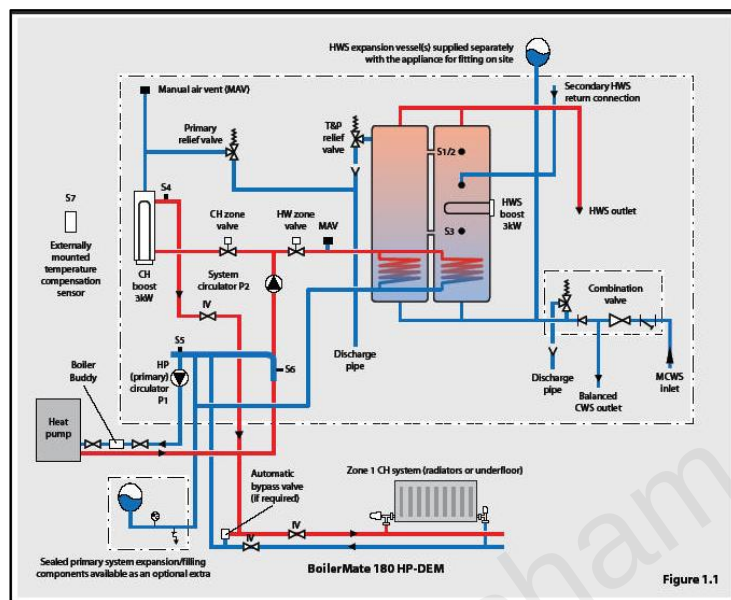


Figure 2: ASHP schematic

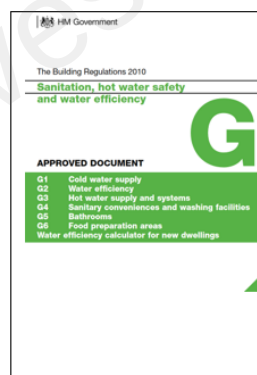
5. WATER EFFICIENCY

- 5.1 The Local Plan Section 5.14.18 states that All new homes should be built to level 3/4 of the Code for Sustainable Homes in terms of water use (105 litres per person per day consumption);
- 5.2 This target is the same as the optional target included within Part G of the Building Regulations which encourages the efficient use of potable water. The specification proposed has been produced using the calculation methodology used to assess compliance against the water performance targets in Building Regulations 17.K and is based on the Government's "The Water Efficiency Calculator for new dwellings – September 2009" (withdrawn in June 2016).
- 5.3 The current guidance and Calculation Methodology can now be found with Approved Document G - Sanitation, hot water safety and water efficiency (2015 edition with 2016 amendments):
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/504207/BR_PDF_AD_G_2015_with_2016_amendments.pdf
- 5.4 The proposed specification for the scheme can be found on the right-hand side of the page showing compliance with the Council's target. This specification seen in Table 5 has been proposed as an example to reach the water efficiency targets. As such this specification is not binding. For the Dishwashers and Washing Machines, default consumption figures have been used.

PROPOSED SANITARYWARE SPECIFICATION

ELEMENT	SPECIFICATION	UNIT OF MEASUREMENT
WC	6/3 dual flush	<i>Litres per Flush</i>
Basin Taps	5	<i>Litres per Minute</i>
Kitchen Sink Taps	9	<i>Litres per Minute</i>
Shower	8	<i>Litres per Minute</i>
Bath	155	<i>Capacity to Overflow</i>
Washing Machine	8.17	<i>Litres per Kilo (Dry)</i>
Dishwasher	1.25	<i>Litres per Place Setting</i>
Total Consumption (Litres / Person / Day)		104.7

Table 5: Proposed Water Consumption (litres/person/day)



6. CONCLUSION

- 6.1 This document illustrates the reduction in carbon emissions of the proposed development in-line with the requirements of the Local Authority and in-line with current best practice guidance.
- 6.2 Measures implemented for this scheme in order to obtain the on-site reduction of CO₂ emissions are:

“Energy Efficiency Measures”

- U-Values are at least 50% better than the Part L limiting parameters.
- Air Permeability 50% better than the Part L limiting parameter.
- 100% low energy lighting

“Renewable Energy”

- Individual Air Source Heat Pumps will be installed to each dwelling.

- 6.3 Via the above measures, the scheme achieves a 39.63% reduction in CO₂ over that of the Part L baseline.
- 6.4 The scheme will also be designed to achieve a Water Efficiency of less than 105ltr/person/day in-line with Policy 5.14.18 requirements.

	Regulated Carbon Dioxide Savings	
	CO ₂ emissions (tonnes/CO ₂ /year)	Site-Wide % Saving in CO ₂ emissions
Baseline: Part L 2013 of the Building Regulations	10.75	
Savings from Energy Demand Reduction	6.49	39.63%

Appendix 1



PROJECT: Goldcrest Mews

RESIDENTIAL UNITS

All Plots	AREA	TER <i>Part L 2013 Baseline</i>	Total TER	DER 'Be Lean'	Total DER 'Be Lean'
	m ²	kg CO2/m ² /yr	kg CO2/yr	kg CO2/m ² /yr	kg CO2/yr
1	97.28	27.98	2,722	16.78	1,632
2	99.94	25.88	2,586	15.91	1,590
3	97.45	26.31	2,564	16.23	1,582
4	101.4	28.43	2,883	16.65	1,688
Total Site Area (m ²):	396	TOTAL TER CO2:	10,755	TOTAL DER CO2:	6,492

Total Site TER	10,755	kg CO2/yr
Total Site DER	6,492	kg CO2/yr
CO2 Savings at 'Be Lean'	39.63%	%

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Appendix 2



Appendix 3



BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	Plot 1 - top of drawing	Issued on Date	05/07/2022
Assessment Reference	001	Prop Type Ref	
Property	Plot 1 , Goldsmith Mews, R/O Osney Way, Gravesend, Kent, DA12 2ND		
SAP Rating	85 B	DER	16.78
Environmental	86 B	TER	27.98
CO ₂ Emissions (t/year)	1.35	% DER<TER	40.02
General Requirements Compliance	Pass	DFEE	58.29
		TFEE	62.04
		% DFEE<TFEE	6.04
Assessor Details	Mr. Neil Rothern, Neil Rothern, Tel: 02037358169, neil@nrgconsulting.org		Assessor ID
Client			L759-0001

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	27.98	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.78	kgCO ₂ /m ²	Pass
	-11.20 (-40.0%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	62.04	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	58.29	kWh/m ² /yr	
	-3.7 (-6.0%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.16 (max. 0.70)	Pass
Roof	0.12 (max. 0.20)	0.12 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Mitsubishi Electric Ecodan 8.5 kW PUZ-WM85VAA	
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	Plot 2 mid top	Issued on Date	05/07/2022
Assessment Reference	001	Prop Type Ref	
Property	Plot 2, Goldsmith Mews, R/O Osney Way, Gravesend, Kent, DA12 2ND		
SAP Rating	85 B	DER	15.91
Environmental	87 B	TER	25.88
CO ₂ Emissions (t/year)	1.31	% DER<TER	38.52
General Requirements Compliance	Pass	DFEE	51.81
		TFEE	55.48
		% DFEE<TFEE	6.61
Assessor Details	Mr. Neil Rothern, Neil Rothern, Tel: 02037358169, neil@nrgconsulting.org		Assessor ID
Client			L759-0001

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	25.88	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	15.91	kgCO ₂ /m ²	Pass
	-9.97 (-38.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.48	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	51.81	kWh/m ² /yr	
	-3.7 (-6.7%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.13 (max. 0.25)	0.16 (max. 0.70)	Pass
Roof	0.12 (max. 0.20)	0.12 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Mitsubishi Electric Ecodan 8.5 kW PUZ-WM85VAA	
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Hot water storage	Nominal cylinder loss: 1.89 kWh/day Permitted by DBSCG 2.24	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Time and temperature zone control	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	4.00 m ² , No overhang	
Windows facing West	12.95 m ² , No overhang	
Air change rate	5.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Roof U-value	0.12	W/m ² K
Floor U-value	0.09	W/m ² K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Hot water storage	Nominal cylinder loss: 1.89 kWh/day Permitted by DBSCG 2.24	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Time and temperature zone control	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	4.00 m ² , No overhang	
Windows facing West	12.95 m ² , No overhang	
Air change rate	5.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Roof U-value	0.12	W/m ² K
Floor U-value	0.10	W/m ² K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	Plot 3 mid bottom			Issued on Date	05/07/2022
Assessment Reference	001	Prop Type Ref			
Property	Plot 2, Goldsmith Mews, R/O Osney Way, Gravesend, Kent, DA12 2ND				
SAP Rating	85 B	DER	16.23	TER	26.31
Environmental	87 B	% DER<TER	38.30		
CO ₂ Emissions (t/year)	1.30	DFEE	52.84	TFEE	56.39
General Requirements Compliance	Pass	% DFEE<TFEE	6.31		
Assessor Details	Mr. Neil Rothern, Neil Rothern, Tel: 02037358169, neil@nrgconsulting.org			Assessor ID	L759-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	26.31	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.23	kgCO ₂ /m ²	Pass
	-10.08 (-38.3%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	56.39	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	52.84	kWh/m ² /yr	
	-3.6 (-6.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.13 (max. 0.25)	0.16 (max. 0.70)	Pass
Roof	0.12 (max. 0.20)	0.12 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Mitsubishi Electric Ecodan 8.5 kW PUZ-WM85VAA	
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Hot water storage	Nominal cylinder loss: 1.89 kWh/day Permitted by DBSCG 2.24	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Time and temperature zone control	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	4.00 m ² , No overhang	
Windows facing West	12.95 m ² , No overhang	
Air change rate	5.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Roof U-value	0.12	W/m ² K
Floor U-value	0.09	W/m ² K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	Plot 4 bottom	Issued on Date	05/07/2022
Assessment Reference	001	Prop Type Ref	
Property	Plot 2, Goldsmith Mews, R/O Osney Way, Gravesend, Kent, DA12 2ND		
SAP Rating	84 B	DER	16.65
Environmental	86 B	TER	28.43
CO ₂ Emissions (t/year)	1.40	% DER<TER	41.43
General Requirements Compliance	Pass	DFEE	59.85
		TFEE	64.08
		% DFEE<TFEE	6.60
Assessor Details	Mr. Neil Rothern, Neil Rothern, Tel: 02037358169, neil@nrgconsulting.org		Assessor ID
Client			L759-0001

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	28.43	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.65	kgCO ₂ /m ²	Pass
	-11.78 (-41.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	64.08	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	59.85	kWh/m ² /yr	
	-4.3 (-6.7%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.19 (max. 0.30)	0.19 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.13 (max. 0.25)	0.16 (max. 0.70)	Pass
Roof	0.12 (max. 0.20)	0.12 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Mitsubishi Electric Ecodan 8.5 kW PUZ-WM85VAA	
Secondary heating system	None	

5 Cylinder insulation

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Hot water storage	Nominal cylinder loss: 1.89 kWh/day Permitted by DBSCG 2.24	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Time and temperature zone control	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	4.00 m ² , No overhang	
Windows facing West	12.95 m ² , No overhang	
Air change rate	5.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	5.00 (design value)	
Maximum	10.0	Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Roof U-value	0.12	W/m ² K
Floor U-value	0.10	W/m ² K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Property Reference	Plot 2 mid top	Issued on Date	05/07/2022
Assessment Reference	001	Prop Type Ref	
Property	Plot 2, Goldsmith Mews, R/O Osney Way, Gravesend, Kent, DA12 2ND		
SAP Rating	85 B	DER	15.91
Environmental	87 B	TER	25.88
CO ₂ Emissions (t/year)	1.31	% DER<TER	38.52
General Requirements Compliance	Pass	DfEE	51.81
		TfEE	55.48
		% DfEE<TfEE	6.61
Assessor Details	Mr. Neil Rothern, Neil Rothern, Tel: 02037358169, neil@nrgconsulting.org		Assessor ID
Client			L759-0001

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

Orientation	East
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	3
3.0 Date Built	2022
4.0 Sheltered Sides	3
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	10.80 m	20.10 m ²	2.50 m
1st Storey:	10.14 m	40.28 m ²	2.85 m
2nd Storey:	11.60 m	39.56 m ²	2.95 m

7.0 Living Area	20.50	m ²
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8.0 Thermal Mass Parameter	Simple calculation - Medium	
Thermal Mass	250.00	kJ/m²K

9.0 External Walls

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
e1	System Build	0.19	90.12	71.09

9.1 Party Walls

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Party Wall 1	Filled Cavity with Edge Sealing		0.00	108.51

10.0 External Roofs

Description	Type	U-Value (W/m ² K)	Gross Area (m ²)	Nett Area (m ²)
External Roof 1	External Flat Roof	0.12	40.28	39.76

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m ² K)	Area (m ²)
Ground Floor exposed upper	Ground Floor - Solid		0.09	20.10
	Ground Floor - Timber		0.16	20.18

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Front Door	Manufacturer	Solid Door							1.40
Windows	Manufacturer	Window	Triple Low-E Hard 0.2			0.64		0.70	1.40
rooflight	Manufacturer	Roof Window	Double Low-E Hard 0.15			0.72		0.70	1.30

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
front door	Solid Door	[1] e1	East							2.08	
Opening 2 GF	Window	[1] e1	West	None	0.00					5.42	
Opening 3 FF	Window	[1] e1	West	None	0.00					5.14	
Opening 4 ff	Window	[1] e1	North	None	0.00					1.89	
Opening 5 2nd f	Window	[1] e1	West	None	0.00					2.39	
Opening 6 2nd f	Window	[1] e1	North	None	0.00					1.38	
Opening 7 2nd f	Window	[1] e1	North	None	0.00					0.73	
from roof plan	Roof Window	[1] External Roof 1	Horizontal	None						0.52	

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

Source Type	Bridge Type	Length	Psi	Imported
Table K1 - Approved	E2 Other lintels (including other steel lintels)	11.71	0.300	Yes
Table K1 - Approved	E3 Sill	10.72	0.040	Yes
Table K1 - Approved	E4 Jamb	21.24	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	11.14	0.160	No
Table K1 - Default	E20 Exposed floor (normal)	10.83	0.320	No
Table K1 - Default	E21 Exposed floor (inverted)	6.44	0.320	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	18.22	0.070	No
Table K1 - Default	E24 Eaves (insulation at ceiling level - inverted)	1.56	0.240	No
Table K1 - Default	E14 Flat roof	10.81	0.080	No
Table K1 - Approved	E16 Corner (normal)	8.30	0.090	No
Table K1 - Approved	E17 Corner (inverted – internal area greater than external area)	2.50	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	24.90	0.060	No
Table K1 - Default	P1 Party wall - Ground floor	7.88	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	22.41	0.000	No
Table K1 - Default	P7 Party Wall - Exposed floor (normal)	8.64	0.160	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	11.08	0.240	No
Table K1 - Default	R1 Head of roof window	0.72	0.080	Yes
Table K1 - Default	R2 Sill of roof window	0.72	0.060	Yes
Table K1 - Default	R3 Jamb of roof window	1.44	0.080	Yes

Y-value 0.131 W/m²K

18.0 Pressure Testing

Yes

Designed AP₅₀ 5.00 m³/(h.m²) @ 50 Pa

Property Tested ?

As Built AP₅₀ m³/(h.m²) @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather Windows fully open

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Cross ventilation possible	No
Night Ventilation	No
Air change rate	5.00

Mechanical Ventilation

Mechanical Ventilation System Present	No
---------------------------------------	----

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System

No

22.0 Lighting

Internal

Total number of light fittings	10
Total number of L.E.L. fittings	10
Percentage of L.E.L. fittings	100.00 %

External

External lights fitted	No
------------------------	----

23.0 Electricity Tariff

Standard

24.0 Main Heating 1

Database	
Percentage of Heat	100 %
Database Ref. No.	104640
Fuel Type	Electricity
Main Heating	PET
SAP Code	224
In Winter	264.1
In Summer	297.5
Controls	CHD Time and temperature zone control
PCDF Controls	0
Sap Code	2207
Is MHS Pumped	Pump in heated space
Heat Emitter	Underfloor
Underfloor Heating	Yes - Pipes in thin screed
Flow Temperature	Normal (> 45°C)

25.0 Main Heating 2

None

Community Heating	None
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28.0 Water Heating

HWP From main heating 1	
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No

SUMMARY FOR INPUT DATA

Calculation Type: New Build (As Designed)

Instantaneous System 2

Waste Water Heat Recovery
Storage System

No

Solar Panel

No

Water use <= 125 litres/person/day

Yes

SAP Code

901

Immersion Only Heating Hot Water

No

29.0 Hot Water Cylinder

Hot Water Cylinder

Cylinder Stat

Yes

Cylinder In Heated Space

Yes

Independent Time Control

Yes

Insulation Type

Foam

Insulation Thickness

85

Cylinder Volume

200.00

Pipes insulation

Fully insulated primary pipework

L

31.0 Thermal Store

None

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
Solar water heating	£4,000 - £6,000	£56	B 87	
	Typical Cost	Typical savings per year	Ratings after improvement	
			SAP rating	Environmental Impact
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£368	A 96	

Appendix 4



PUZ-WM85VAA(-BS)

Ecodan R32

Monobloc Air Source Heat Pump

R32

Key Features:

- A+++ high efficiency system
- Ultra quiet noise levels
- Maintains full heating capacity at low temperatures
- Zero carbon solution
- MELCloud enabled

Key Benefits:

- Ultra low running cost
- Flexible product placement
- Confident and quick product selection
- Help to tackle the climate crisis
- Remote control, monitoring, maintenance and technical support



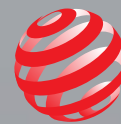
MELCloud



Manufactured in the UK



037-0033-20-03



ecodan[®]
Renewable Heating Technology

OUTDOOR UNIT		PUZ-WM85VAA(-BS)
HEAT PUMP SPACE HEATER - 55°C	ErP Rating	A++
	η_s	139%
	SCOP (MCS)	3.48
HEAT PUMP SPACE HEATER - 35°C	ErP Rating	A+++
	η_s	193%
	SCOP (MCS)	4.84
HEAT PUMP COMBINATION HEATER - Large Profile ^{*1}	ErP Rating	A+
	η_{wh}	145%
	Capacity (kW)	8.5
HEATING ^{*2} (A-7/W35)	Power Input (kW)	3.27
	COP	2.60
OPERATING AMBIENT TEMPERATURE (°C DB)		-20 ~ +35
SOUND DATA ^{*3}	Pressure Level at 1m (dBA)	45
	Power Level (dBA) ^{*4}	58
WATER DATA	Pipework Size (mm)	28
	Flow Rate (l/min)	24
	Water Pressure Drop (kPa)	15.0
DIMENSIONS (mm)	Width	1050
	Depth	480
	Height	1020
WEIGHT (kg)		98
ELECTRICAL DATA	Electrical Supply	220-240V, 50Hz
	Phase	Single
	Nominal Running Current [MAX] (A) ^{*5}	9.1 [22]
	Fuse Rating - MCB Sizes (A) ^{*6}	25
REFRIGERANT CHARGE (kg) / CO ₂ EQUIVALENT (t)		R32 (GWP 675) 2.2 / 1.49

Notes:

*1 Combination with E*PT20X Cylinder

*2 Under normal heating conditions at outdoor temp: -7°CDB / -8°CWB, outlet water temp 35°C, inlet water temp 30°C.

*3 Under normal heating conditions at outdoor temp: 7°CDB / 6°CWB, outlet water temp 55°C, inlet water temp 47°C as tested to BS EN14511.

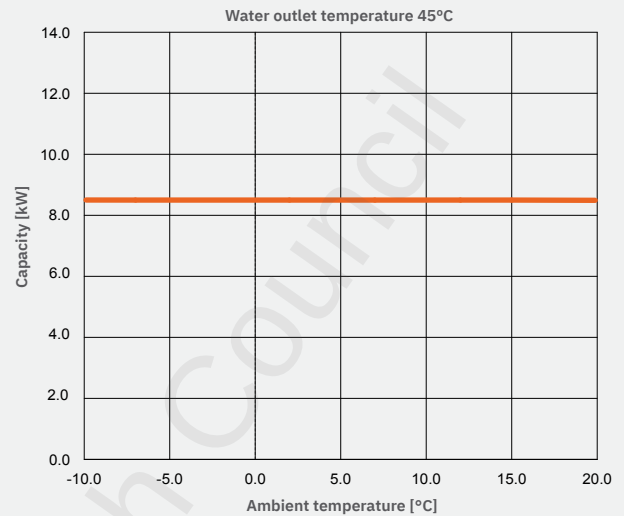
*4 Sound power level tested to BS EN12102.

*5 Under nominal heating conditions at outdoor temp: 7°C, outlet water temp: 35°C.

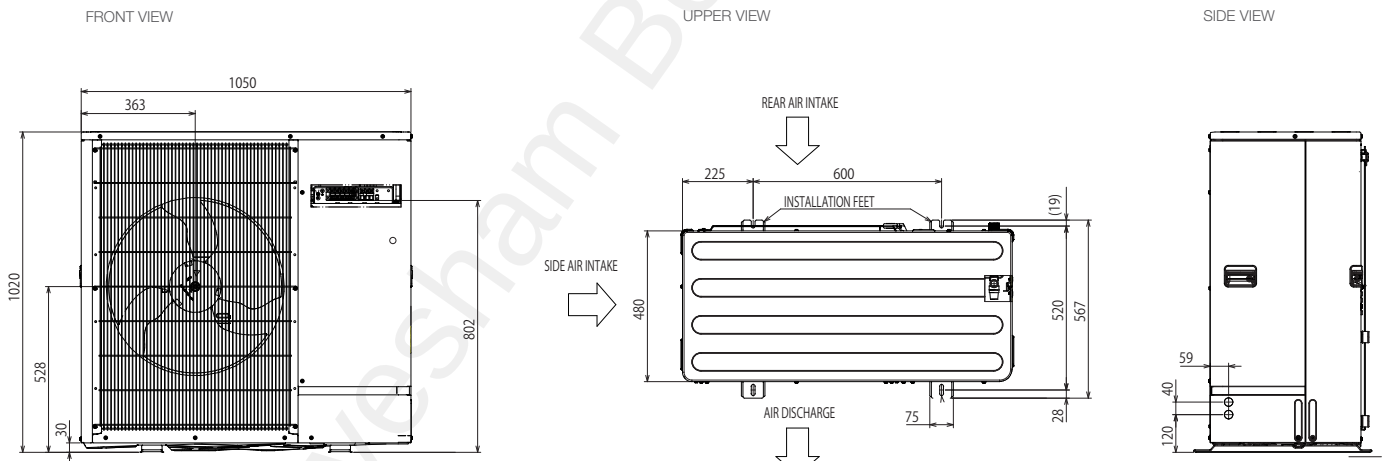
*6 MCB Sizes BS EN60898-2 & BS EN60947-2.

η_s is the seasonal space heating energy efficiency (SSHEE) η_{wh} is the water heating energy efficiency

NOMINAL HEATING CAPACITY



PUZ-WM85VAA(-BS) DIMENSIONS



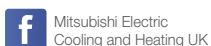
All dimensions (mm)



Telephone: 01707 282880
email: heating@meuk.mee.com
heating.mitsubishielectric.co.uk



@meuk_les
@green_gateway



Mitsubishi Electric Living
Environmental Systems UK



Mitsubishi Electric Living
Environmental Systems UK

BLOG thehub.mitsubishielectric.co.uk

UNITED KINGDOM Mitsubishi Electric Europe Living Environment Systems Division, Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England. Telephone: 01707 282880 Fax: 01707 278881
IRELAND Mitsubishi Electric Europe, Westgate Business Park, Ballymount, Dublin 24, Ireland. Telephone: (01) 419 8800 Fax: (01) 419 8890 International code: (003531)

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Note: Refer to 'Installation Manual' and 'Instruction Book' for further 'Technical Information'. The fuse rating is for guidance only and please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No 626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of August 2020

