Energy Statement

PROPOSED NEW TWO STOREY DWELLING

Land adjacent to the Old Rectory, Station Rd, Potterhanworth, LN4 2DX

January 2024

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1.0 Introduction

1.1 This Energy Statement accompanies a Full Planning Application for the erection of 1no. two storey dwelling on the garden land to the north of the Old Rectory site on Station Rd, Potterhanworth, LN4 2DX.

1.2 The proposed development site is located on existing garden land to the north-east of the Old Rectory, located on Station Rd, Potterhanworth, LN4 2DX. The site will be sub divided into two to form two separate plots.

1.3 The proposals are for the erection of a 1no. two storey dwelling with associated garage and landscaping. The dwelling is arranged to reflect the scale and character of development in this part of the village and is carefully designed to respect the neighbouring context, maximising separation and minimising overlooking. The holistic design approach for the development draws upon the need for high quality, sustainable homes.

Figure 01. Aerial view of showing the location of the proposed development site.

1.4 The proposed dwelling will be situated centrally within the plot to follow the existing building line and plan form of the adjacent residential properties. The garage and main access to the property are located to the front of the plot. To the rear of the site, proposals are for a private garden space.

1.5 Internally, the proposed layout responds to the client needs and the existing site conditions. The house features 4 bedrooms, with 2 ensuites, 1 shared bath, open plan kitchen, living and dining, snug, office, utility, boots room and WC. Their location and orientation is determined by aiming to maximise natural light into the spaces and creating a hierarchy between public and private areas.

1.6 Architecturally, the design draws upon the local vernacular. The proposals are in keeping with the surrounding architectural language whilst providing a more contemporary style. The materials chosen consist of materials present in the neighbouring buildings, including natural brick, clay tiles and timber doors.

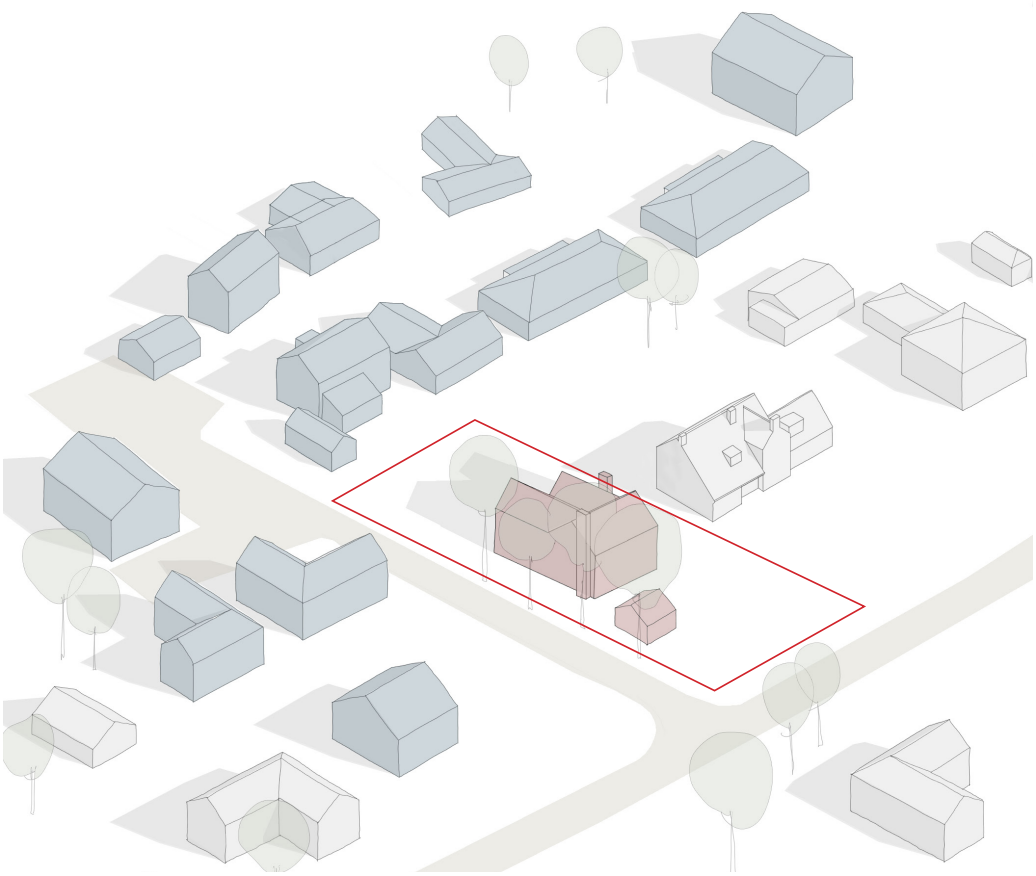


Figure 02. Axonometric sketch of the development site

2.0 Planning Policy

2.1 Section 3.2 of the Central Lincolnshire Local Plan (adopted on the 13th April 2023) focuses on making sure that new build developments have a much reduced energy demand and take all practical and reasonable steps to generate low or zero carbon. This section introduces Policy S6: Design Principles for Efficient Buildings and S7: Reducing Energy Consumption – Residential Development, and details approaches for compliance.

This report will use the SAP route to demonstrate details of assured performance targets, and how the proposed development will accord with the aims of the above policies.

3.0 Site Smart

3.1 The following section sets out the approach for optimising building orientation and form and covers the relevant policy components 1 (orientation of the building) and 2 (form of the building) of Policy S6: Design Principles for Efficient Buildings. This section will describe the design challenges of the proposed development site and explain how informed and proportionate early decisions have been considered in accordance with best practice and targets set out in the Central Lincolnshire Energy Efficiency Design Guide (2023).

3.2 **S6.1 - ORIENTATION OF BUILDINGS**

3.2.1 Component 1: Orientation of Buildings considers the positioning of buildings to maximise opportunities for solar gain and minimise winter heat loss. A building's orientation can contribute to reducing the space heating energy demand where north facing windows lead to a net heat loss whereas south facing windows can usually be designed to achieve a net heat gain. Controlling solar gain through orientation and external wall to window ratio is key for reducing space heating energy demand and limiting elevated summer solar gains and overheating potential.

3.2.2 The building orientation and form were informed by the balance between various site constraints and natural climate factors in order to develop an efficient design that responds to its context and maximises natural resources. The proposals aim to maximise solar gains and natural light into the plan through the building orientation and amount and sizing of openings. Most of the habitable rooms have been positioned to the south to maximise their solar gains.

3.2.3 The proposed new doors and windows are to be thermally efficient double glazed units to achieve excellent 'U' Values and provide generous natural daylighting. The building fabric is designed to exceed building regulations standards set out under the Approved Document L Volume 2, 2021 edition incorporating 2023 amendments, making the dwelling extremely energy efficient which will result in less usage of heating systems.

3.2.4 With regards to the proposed heating system, an Air Source Heat Pump (ASHP) will be installed in the property to provide heating and hot water. Natural ventilation strategies including cross ventilation will be implemented to allow for natural cooling during warm periods.

3.2.5 Where applicable, window ratios have been designed in accordance with best practices outlined in the Central Lincolnshire Energy Efficiency Design Guide (2023). Refer to the Figure 04 below.

External Wall Orientation	Window Ratio
North-facing	20 - 30%
East-facing	20 - 40%
South-facing	30 - 40%
West-facing	20 - 40%

Figure 04. Best practice window ratios.

3.2.6 Generally, windows to main communal areas including open plan kitchen, dining and living are designed to be dual aspect, benefiting from daylighting in two directions to provide adequate daylight penetration while still maintaining good window ratios.

3.2.7 The proposed layout and window locations and sizes will contribute to a good standard of natural light in the dwelling, minimising reliance on artificial lighting. All artificial lighting will be specified as energy-efficient LED fittings.

3.3 S6.2 - FORM OF BUILDINGS

3.3.1 Component 2: Form of Buildings considers the shape and design of buildings to maximise their efficiency by minimising the surface area from which heat loss occurs. Buildings with lower form factors remain warmer in colder conditions and remain cooler in warmer conditions. A building's form factor is the ratio of a building's exposed external surface area to its gross internal area. External surface area includes walls, roofs, and ground floors.

3.3.2 The dwelling has been designed with compact forms to reduce the surface area as far as reasonably practical while still reflecting the character of the area. It has also been designed to a form factor less than 3.0 and, for houses and low rise flats, is considered ideal for passive house construction. (Passive House Plus)

4.0 Fabric First

4.1 The following section sets out the approach for optimising the use of materials and building techniques that reduce heat and energy requirements and covers the relevant policy component 3 (fabric of buildings) of Policy S6: Design Principles for Efficient Buildings. This section will explain how informed and proportionate early decisions have been considered in accordance with best practice and targets set out in the Central Lincolnshire Energy Efficiency Design Guide (2023).

4.2 The fabric-first approach adopted for the proposed development prioritises minimising energy demands through passive design measures, limiting reliance on active strategies and renewable technologies such as photovoltaic panels.

4.3 The proposed U-values for thermal elements are specified in line with recommendations for compliance with the Policy S7 SAP route for residential buildings and exceed the notional targets set out in Part L of the Approved Documents (Building Regulations). Refer to Figure 05 below. The proposed dwelling will be detailed to reduce thermal bridging and further optimise the control of internal temperatures with minimal energy usage.

	Design Element	Recommended Specification
Ground Floor	0.10 W/m²K	≤ 0.10 W/m²K
Walls	0.13 W/m²K	≤ 0.13 WW/m²K
Roof	0.10 W/m²K	≤ 0.10 W/m²K
Windows	0.8 W/m²K	≤ 0.8 W/m²K
Air Permeability	4.0m3/hm^2	≤ 1.0m^3/hm^2
Ventilation	MVHR, 90% efficiency	MVHR, ≥ 90% efficiency
PV Panels	PV Panels	Designed to suit annual energy demand.

Figure 05. Proposed design elements in line with recommendations for compliance with Policy S7 SAP route.

4.4 For controlling solar gain, all windows are to have a glazing g-value ≤ 0.5.

4.5 The proposed dwelling will target an undisturbed airtight envelope with high airtightness ≤ 4.0m^3/hm^2. This performance target will aim to minimise the air change rate, therefore reducing heat loss through the building envelope.

4.6 Further to operating active ventilation purging (refer to Section 5 Sustainable Systems for further details), the dwelling has been designed with the capacity to purge hot air and limit the risk of overheating through natural ventilation purging. Generally, the main living spaces with openings on opposite elevations have been designed to best practice such that the depth of each is no greater than five times its height, therefore permitting effective cross ventilation.

5.0 Sustainable Systems

5.1 The following section covers the relevant policy component 3 (heat supply) of Policy S6: Design Principles for Efficient Buildings and sets out the approach for supplying energy efficient heating systems. This section will explain how the proposed development site intends to implement a net zero carbon content of heat supply, transitioning from connecting onto the gas network or using oil or bottled gas as set out in the Central Lincolnshire Energy Efficiency Design Guide (2023).

5.2 Heat pumps are the most efficient source zero-emissions heating. To meet both domestic hot water and space heating requirements, the dwelling will be installed with an appropriately sized Air Source Heat Pump (ASHP). For compliance with the Policy S7 and S8 SAP route the Flow Temperature Value of the ASHPs are less than 45°.

5.3 The dwelling will be installed with a Mechanical Ventilation with Heat Recovery (MVHR) system for providing constant background ventilation, by recycling heat from outgoing stale air to warm incoming fresh air. This energy efficient process leads to improved indoor air quality while reducing additional space heating requirements.

5.4 Absolute demand reduction technologies will be used to reduce peak heating demands, including installation of insulated hot water tanks to target a heat loss of less than 1 kWh/day. Furthermore, all fittings will be specified in accordance with the Association for Environment Conscious Building (AECB) Good Practice Fittings Standard and are outlined in Figure 06 below.

	Proposals
Showers	6 to 8 l/min measured at installation
Basin Taps	4 to 6 l/min measured at installation (per pillar tap or per mixer outlet)
Kitchen Sink Taps	6 to 8 l/min measured at installation
WCs	≤ 6 l full flush when flushed with the water supply connected
Baths	≤ 180 litres measured to the centre line of overflow

Figure 06. AECB Good Practice Fittings Standard

5.5 As the proposed technologies outlined above will be unfamiliar to most building users, a simple operating and maintenance guide will be provided to the occupants at post-construction to enbale them to use the energy systems effectively.

6.0 Green Generation

6.1 The following section covers the relevant policy component 5 (renewable energy generated) of Policy S6: Design Principles for Efficient Buildings and sets out the approach for optimising local renewable energy generation to meet reasonable estimates of all regulated and unregulated total annual energy demand across the year as set out in the Central Lincolnshire Energy Efficiency Design Guide (2023).

6.2 The plot presents a significant opportunity for installing renewable energy generation systems, principally solar thermal and photovoltaic panels. For compliance with this component, and to provide zero carbon power for home appliance use and heating generation, the plot will be installed with solar photovoltaic (PV) panels.

6.3 To maximise solar generation, PV panels require unobstructed access to direct sunlight and should be oriented to the south, or along a shallow E-W axis. Although south facing PV panels are more effective, it is not essential for all panels to face south. The Central Lincolnshire Energy Efficiency Design Guide (2023) notes that, generally, maximising roof area utilisation is more important than optimising panel angle and orientation. Refer to PP002 and PP100 drawing series for location of PV panels.

6.4 The percentage of roof area to be installed with photovoltaic panels will be calculated based on the total energy demand for the dwelling, as per the SAP calculations in Appendix 1.0. Requirements for the PV array in terms of performance and output will be designed with a specialist supplier. PV panels are to be installed to the south, .

7.0 Conclusions

7.1 This Energy Statement has been produced in support of a Full Planning Application for the proposed erection of a new 2no. storey property part of the Old Rectory site, on Station Rd, Potterhanworth, LN4 2DX.

7.2 The design of the proposed development site has been prepared to satisfy Policies S6, S7 and S8 of the Central Lincolnshire Local Plan (adopted on the 13th April 2023). The supporting Energy Statement outlines where Informed and proportionate early design decisions have been considered in accordance with best practice and targets set out in the Central Lincolnshire Energy Efficiency Design Guide (2023). The proposed development makes use of a compact building form, optimal window to external wall ratios, and a fabric first approach to minimise spatial heating demand and limit reliance on active strategies.

7.3 SAP calculations have been provided to evidence the predicted energy performance of the proposed development site and are included in Appedix 1.0.

7.4 In conclusion, the proposed strategies have sufficiently reduced predicted energy demand. With the inclusion of sustainable systems and green generation outlined in sections 5.0 & 6.0, the proposed development is deemed to satisfy the mandatory planning requirements of Policies S6 & S7 of the Central Lincolnshire Local Plan (April 2023).

Appendix 1.0

SAP Calculations

Predicted Energy Assessment

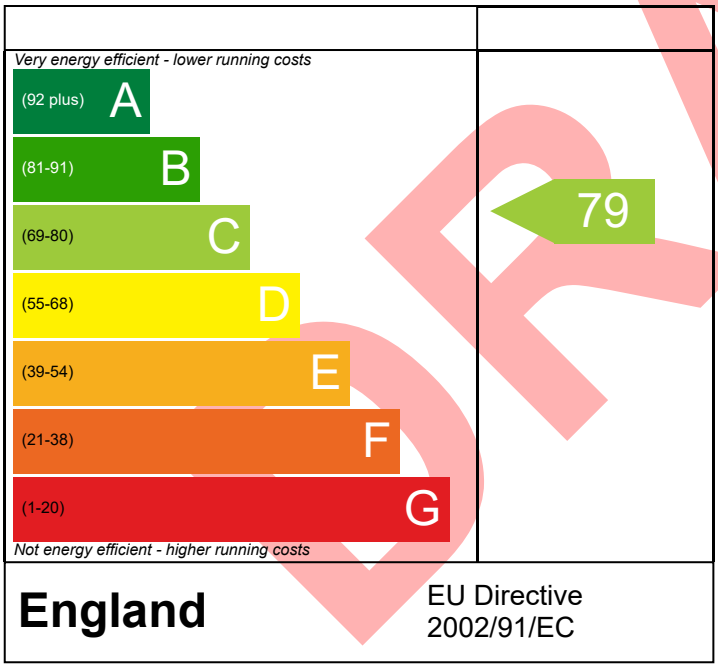
Plot adj to the Old Rectory, Potterhanworth

Dwelling type:	House, Detached
Date of assessment:	04/03/2024
Produced by:	Simon Nind
Total floor area:	202.33 m²
DRRN:	

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

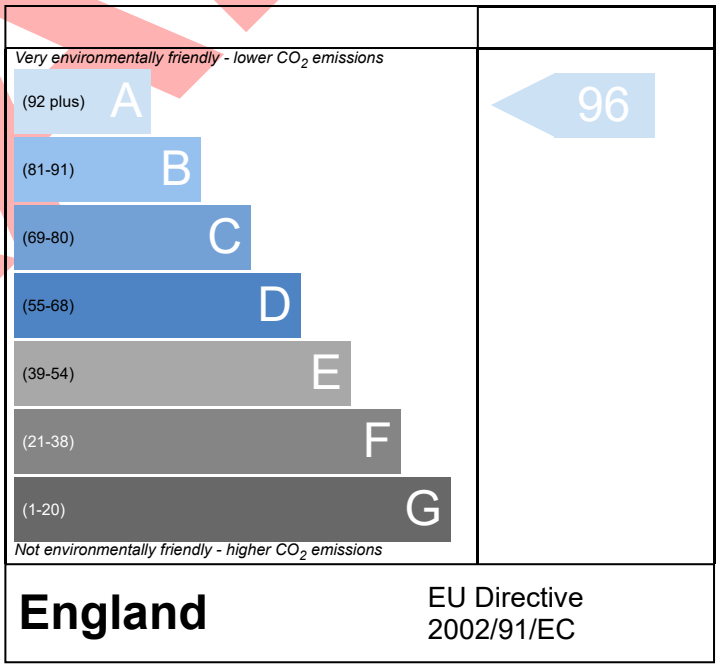
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating the less impact it has on the environment.

Summary for Input Data

Property Reference	the Old Rectory	**Issued on Date**	04/03/2024
Assessment Reference	00001	**Prop Type Ref**	
Property	Plot adj to the Old Rectory, Potterhanworth		

SAP Rating	79 C	**DER**	3.66	**TER**	7.36
Environmental	96 A	**% DER < TER**			50.27
CO_2 Emissions (t/year)	0.73	**DFEE**	42.65	**TFEE**	37.40
Compliance Check	See BREL	**% DFEE < TFEE**			-14.05
% DPER < TPER	-11.05	**DPER**	42.85	**TPER**	38.59

Assessor Details	Mr. Simon Nind	**Assessor ID**	6133-0002
Client			

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

Orientation	North
Property Tenture	1
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	House, Detached
2.0 Number of Storeys	2
3.0 Date Built	2023
4.0 Sheltered Sides	0
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:	47.20 m	100.13 m²	2.40 m
1st Storey:	45.40 m	102.20 m²	2.60 m

8.0 Living Area 16.65 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
External Wall 1	Cavity Wall	Other	0.13	0.00	231.32	185.87	0.00	None	45.45	Calculate Wall Area

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
Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.10	9.00	102.20	102.20	None	0.00	Enter Gross Area	0.00

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	Other	0.10	None	0.00	0.00	100.13
First floor	Exposed Floor - Solid	+1	Other	0.10	None	0.00	0.00	2.07

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Filling Type	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Doors	Manufacturer	Half Glazed Door	Triple glazed			0.68		0.70	0.80
Windows	Manufacturer	Window	Triple glazed			0.68		0.70	0.80
Roof lights	Manufacturer	Roof Light	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Area (m²)	Pitch
Front door	Doors	External Wall 1	North	2.10	
Front windows	Windows	External Wall 1	North	9.48	
Right windows	Windows	External Wall 1	East	4.80	
Rear windows	Windows	External Wall 1	South	17.76	
Left windows	Windows	External Wall 1	West	9.21	

Summary for Input Data

elmhurst energy

Right Door	Doors	External Wall 1	East	2.10

14.0 Conservatory	None	
15.0 Draught Proofing	100	%
16.0 Draught Lobby	No	
17.0 Thermal Bridging	Default	

17.1 List of Bridges

Bridge Type	Source Type	Length	Psi	Adjusted Reference:	Imported
E2 Other lintels (including other steel lintels)		23.60			No
E3 Sill		21.60			No
E4 Jamb		53.40			No
E5 Ground floor (normal)		62.70			No
E10 Eaves (insulation at ceiling level)		28.00			No
E12 Gable (insulation at ceiling level)		34.70			No
E16 Corner (normal)		16.80			No
E17 Corner (inverted – internal area greater than external area)		7.20			No

Y-value	0.20	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	4.00	m³/(h.m²) @ 50 Pa
Test Method	Blower Door	
19.0 Mechanical Ventilation		
Mechanical Ventilation		
Mechanical Ventilation System Present	No	
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	70.00	5	350	18

24.0 Main Heating 1	SAP table	
Percentage of Heat	100.00	%
Fuel Type	Electricity	
SAP Code	524	
In Winter	170.00	
In Summer	170.00	
Controls SAP Code	2506	
25.0 Main Heating 2	None	
26.0 Heat Networks	None	

	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										

27.0 Secondary Heating		
Secondary Heating	SAP table	
SAP Code	633	
SHS efficiency	60.00	%
HETAS Approved System	Yes	
28.0 Water Heating		
Water Heating	Main Heating 1	
SAP Code	901	

Summary for Input Data

elmhurst energy

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
Supplementary Immersion	No
Immersion Only Heating Hot Water	No

28.1 Showers

Description	Shower Type	Flow Rate [l/min]	Rated Power [kW]	Connected	Connected To

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	300.00	L
Loss	1.90	kWh/day
Pipes insulation	Fully insulated primary pipework	
In Airing Cupboard	No	
31.0 Thermal Store	None	
32.0 Photovoltaic Unit	One Dwelling	
Export Capable Meter?	Yes	
Connected To Dwelling	Yes	
Diverter	No	
Battery Capacity [kWh]	0.00	

PV Cells kWp	Orientation	Elevation	Overshading	FGHRS	MCS Certificate	Overshading Factor	MCS Certificate Reference	Panel Manufacturer
4.00	West	30°			Yes	1.00		

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
£4,000 - £6,000	£75	C 80	A 96
		0	0
		0	0

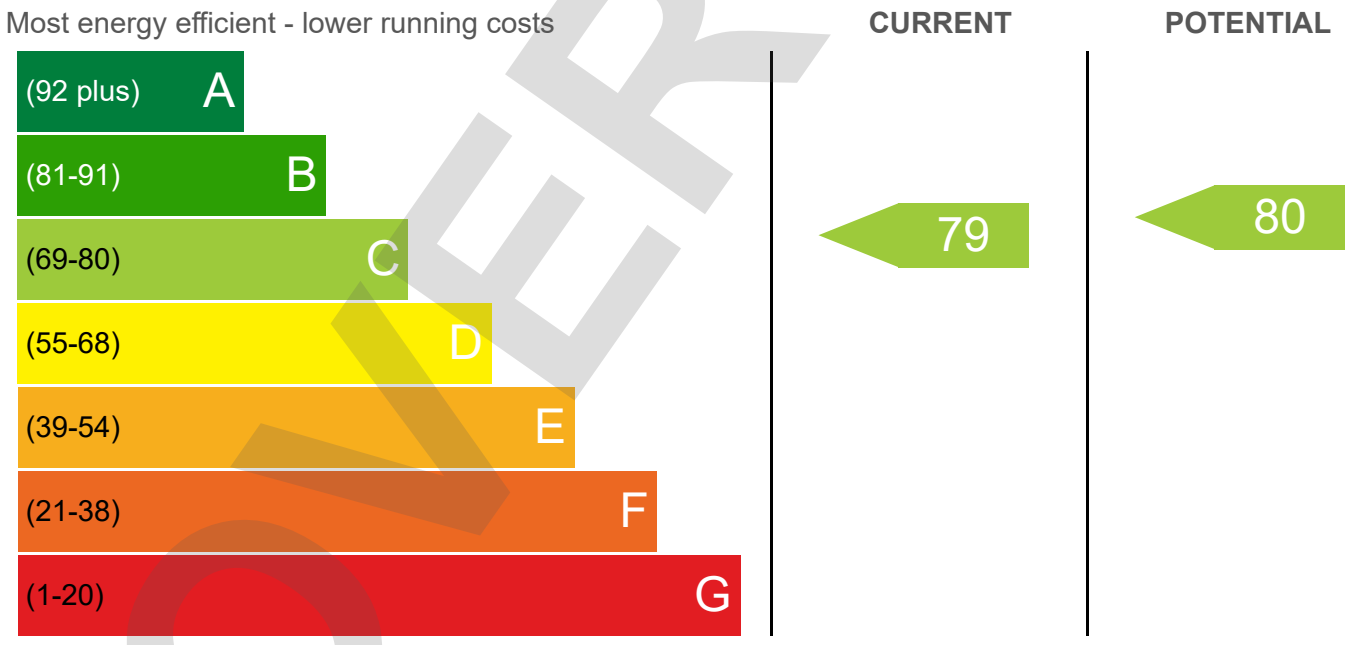
Overview Report

Dwelling Address	Plot adj to the Old Rectory, Potterhanworth
Report Date	04/03/2024
Property Type	House, Detached
Floor Area [m^2]	202

This document is not an Energy Performance Certificate (EPC) as required by the Energy Performance of Buildings Regulations

Energy Rating

The current energy rating represents the overall energy efficiency of the dwelling. The potential energy rating is the overall energy rating of the dwelling after all of the recommend measures provided on the next page have been installed. A higher score represents a more energy efficient dwelling with lower fuel bills.



Overview Report

Breakdown of property's energy performance

Each feature is assessed as one of the following:

Very Poor | Poor | Average | Good | Very Good

Feature	Description	Energy Performance
Walls	Average thermal transmittance 0.13 W/m²K	Very Good
Roof	Average thermal transmittance 0.1 W/m²K	Very Good
Floor	Average thermal transmittance 0.1 W/m²K	Very Good
Windows	High performance glazing	Very Good
Main heating	Air source heat pump, warm air, electric	Poor
Main heating controls	Time and temperature zone control	Very Good
Secondary heating	Room heaters, wood logs	
Hot water	From main system	Average
Lighting	Good lighting efficiency	Good
Air tightness	Air permeability [AP50] = 4.0 m³/h.m² (assumed)	Good

Primary Energy use

The primary energy use for this property per year is 42 kilowatt hour (kWh) per square metre

Estimated CO_2 emissions of the dwelling

The estimated CO rating provides an indication of the dwelling's impact on the environment in terms of carbon dioxide emissions; the higher the rating the less impact it has on the environment.

The estimated CO emissions for this dwellings is: **0.7** per year

Overview Report

With the recommended measures the potential CO emissions could be: **0.0** per year

Recommendations

The recommended measures provided below will help to improve the energy efficiency of the dwelling.
To reach the dwelling's potential energy rating all of the recommended measures shown below would need to be installed.
Having these measures installed individually or in any other order may give a different result when compared with the cumulative potential rating.

Recommended measure	Typical Yearly Saving	Potential Rating after measure installed	Cumulative savings (per year)	Cumulative Potential Rating
Solar water heating	£75	1	£75	C 80
Photovoltaic		-80	£1394	G 0

Estimated energy use and potential savings

Estimated energy cost for this property over a year

£1394

Over a year you could save

£75

The estimated cost and savings show how much the average household would spend in this property for heating, lighting and hot water. It is not based on how energy is used by the people living at the property.

Contacting the assessor and the accreditation scheme

Overview Report

Assessor contact details	
Assessor name	Mr. Simon Nind
Assessor's accreditation number	
Email Address	

Accreditation scheme contact details	
Accreditation scheme	
Telephone	
Email Address	

Assessment details	
Related party disclosure	
Date of assessment	04/03/2024
Date of certificate	04/03/2024
Type of assessment	SAP, new dwelling