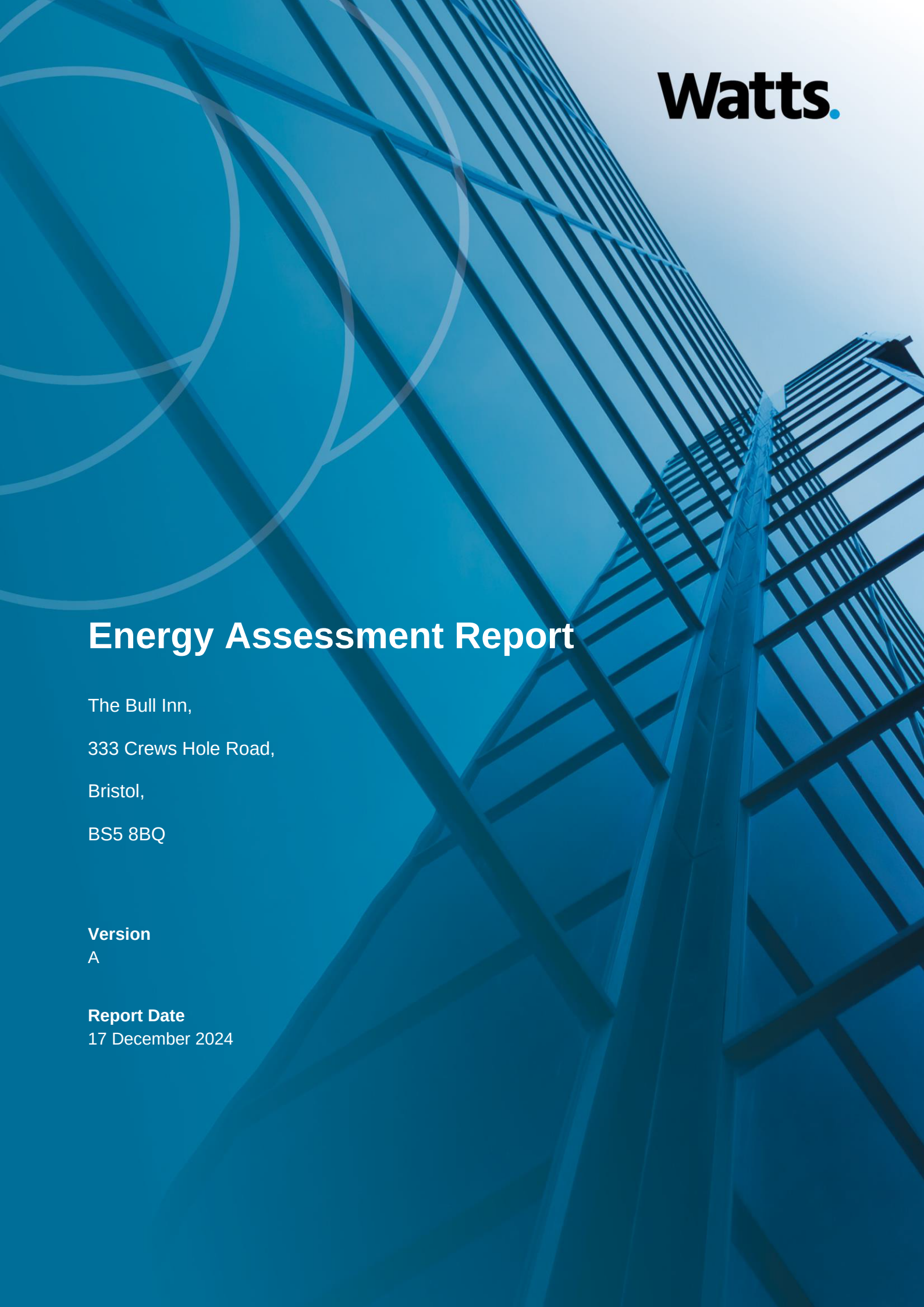

Energy Assessment Report

The Bull Inn,

333 Crews Hole Road,

Bristol,

BS5 8BQ

Version
A

Report Date
17 December 2024

Project Preface

Client Name and Address

Caldecotte Group
15 London House
Swinfens Yard
Stony Stratford
Milton Keynes
MK11 1SY

Watts Details

Director Responsible:	Matt Jeeves	[redacted]
Prepared at:	42 Trinity Square London EC3N 4TH	
Document Prepared by:	Tom Belton	[redacted]
Job Reference:	202064	
Reviewed by:	David Izunna	[redacted]

1.0 Introduction

Watts Group has been commissioned to produce an energy assessment for the proposed development at the Bull Inn, 333 Crews Hole Road, Bristol, BS5 8BQ.

This report demonstrates compliance with national, regional and local planning policy and the building regulation part L1 for the development at the Bull Inn. This includes intent to design the building and its services installations in line with Bristol Local Plan as detailed in its Supplementary Planning Document (SPD) on sustainable design and construction.

The Bristol local adopted local plan requires all new residential developments to submit an energy assessment. It requires all non-major residential developments provided in new buildings to achieve a minimum of 20% in carbon emissions.

1.1 Site Description

The existing pub is to be demolished, and replaced with a three storey residential building, that will accommodate nine new residential units.

Only residential developments of 10 or more flats is considers as a major development in the Bristol local plan.

1.2 The Energy Hierarchy

In line with the Bristol council guidance, the energy hierarchy has been utilised to target the required CO_2 emission reduction set out in this report. The priority is to maximise energy efficiency measures and minimise the energy demand.

To minimise demand, highly insulated fabric is proposed and then improvements in the efficiency of all mechanical and electrical services is implemented to reduce energy consumption. With all achievable methods of reduction in place and all plant functioning efficiently, it is then appropriate to consider how to generate energy from renewable sources.

The development's Energy Assessment derives from the energy hierarchy, hence has adopted the following ethos:

- **Meet or Exceed Building Regulation Requirements:** Prioritising the use of less energy
- **District Heating Feasibility:** Supplying energy efficiently
- **Renewable Energy:** Consideration given to renewable energy technologies

2.0. Meet or Exceed Building Regulation Requirements

This section outlines the design energy efficiency measures taken in order to minimise the building's energy demand and therefore reduce energy use and CO_2 emissions.

The energy efficient measures include reducing heat loss through the fabric of the building during the heating season in order to minimise the energy required for space heating. The heat loss through the different elements of the building is dependent on the U-value of that element. For the proposed building, fabric element U-values are set equal to or less than those set out in ADL1 2023.

Infiltration heat losses occur through small gaps in the construction elements where heated internal air is able to pass through the envelope of the building. Infiltration losses occur mainly around the edge of apertures (doors and windows) and through construction junctions. Although infiltration cannot be eliminated altogether from the building, it will be minimised through ensuring good construction detailing and using best practice construction techniques (e.g. ensuring a constant unpunctured vapour control layer and robust detailing at critical junctions). Current AD Part L building regulations set a maximum air permeability of 5 $m^3/(h.m^2)$ at 50 Pa. Through adopting good construction practice technique, it is intended to improve upon this to achieve better airtightness.

The proposed development will achieve the U-values and airtightness as presented in the table below by incorporating good levels of insulation and high specification window units, complemented with best practice construction techniques,

Building Element	Proposed Specification (U-value)
External Walls U-value	0.15 $W/m^2.k$
Window units (whole window) U-value	1.2 double glazing $W/m^2.k$, g value of 0.73
Floor U-value	0.10 $W/m^2.k$
Roof U-value	0.11 $W/m^2.k$
Air permeability $m^3/(h.m^2)$ at 50 Pa	3.5 $m^3/(h.m^2)$ at 50 Pa

The building shall have a heat recovery ventilation system where heat is recovered from the exhaust air stream. The proposed system shall have a heat recovery efficiency of 90% and a specific fan power of 0.79 W/l/s.

Light fittings are low energy Light Emitting Diode (LED) lighting providing 95 lumen per circuit watts.

The proposed ventilation system is a heat recovery ventilation system where heat is recovered form the exhaust air stream. The proposed system shall have a heat recovery efficiency of 90% and a specific fan power of 0.79 W/l/s.

3.0. District Heating Feasibility

The energy hierarchy proposes exploiting local energy resources and supply energy efficiency and encourages the connect to district heating systems where feasible.

The heat hierarchy to connect to district heat networks should be followed, or utilise communal or individual renewable heat systems where connection to a heat network is not available or planned.

According to the councils requirements, major development should connect to existing heat networks or if they are not currently installed, infrastructure for future connection to the district heat network should be installed.

The implementation of a district heating strategy should be decided according to good practice design. Key factors for efficient implementation of district heating system are:

- Development with high heating load for the majority of the year.
- The overall efficiency of the system
- The initial capital cost and the running cost of the system

A district heating system is not being considered for this development due to the following reasons:

- There is no heat network currently available near the site or any plan to install one locally
- The proposal is to provide less than the 100 homes or 10,000m² floorspace that is deemed feasible by the council for a connection to the heat network
- Economic viability is heavily dependent on the demand for heat , as well as price of electricity and gas. The heat demand of the proposed development is not sufficient for a heat network system to run efficiently.

Hence, the implementation of a district heating strategy is not recommended for this development.

4.0. Renewable Energy

Heating and hot water will be provided via an Air Source Heat Pump (ASHP) with a space heating efficiency of 270%. Heat pumps are considered renewable energy sources/ low carbon technologies in the context of ADL1.

The proposed air source heat pumps are Ecodan heat pumps, model PUZ-WM60VAA as manufactured by Mitsubishi Electric.

This is large improvement over the gas fired boiler plant or direct electric heating. Typical efficiency of well performing condensing gas fired boilers is much less with the current approved document (ADL 2023) setting a limit of 89.5%, hence the proposed heat pump installation will have a performance better than the value set in the approved document.

In addition, some Photovoltaic (PV) system will need to be installed, equating to two photovoltaic panels per flat, each photovoltaic panel generating 400 Watts each.

Result and Conclusion

This preliminary energy statement has been developed to analyse the energy strategies proposed for the Bull Inn development. The aim is to minimise the development's energy consumption and consequently its carbon footprint by implementing different energy saving measures as well as through the utilization of Low or Zero Carbon technology. In particular, an energy and sustainability analysis has been undertaken to satisfy the following requirements:

- To demonstrate that the final fabric and systems proposal comply with Part L of the building regulation as set out in ADL1.

In order to meet this requirement, a wide range of energy saving measures have been considered. Those measures identified as both relevant and with potential to provide substantial savings are intended to be implemented to achieve the maximum energy efficiency and CO_2 emission reduction.

To evaluate compliance with the building regulations, the energy demand and CO_2 emissions for the development has been assessed through SAP10 calculations. The final calculation results are summarised in the table below.

NO DISTRICT HEAT CONNECTION	Regulated Energy Demand (MWh/yr)	Regulated CO2 emissions (tonnes/yr)	CO2 saved (tonnes/yr)	% CO2 reduction
Baseline - Part L TER	66.34	0.32	-	-
Proposed scheme after energy efficiency measures	57.04	0.28	0.04	12.50%
Proposed scheme after on-site renewables	47.22	0.21	0.07	25%

The table above show that the proposed building clearly meet the target emission rate, target primary energy rate and the target fabric energy efficiency rate set out in ADL1 and hence complies with Part L of the building regulations.

It is also evident that an overall 25% reduction in CO_2 emission has been achieved with the measures outlined in this energy assessment.

Watts.

CONTACT DETAILS

London.
0207 280 8000
london@watts.co.uk

Manchester.
0161 831 6180
manchester@watts.co.uk

Bristol.
0117 927 5800
bristol@watts.co.uk

Belfast.
028 9024 8222
belfast@watts.co.uk

Cardiff.
02920 508 625
cardiff@watts.co.uk

Leeds.
0113 245 3555
leeds@watts.co.uk

Glasgow.
0141 353 2211
glasgow@watts.co.uk

watts.co.uk