

Energy & Sustainability Statement

Kings Copse Avenue
Hedge End

22.09.25 V1



Author	Claire Westron BSc (Hons), MSc
Position	Director, Resolution Energy Ltd
Accreditations	On Construction Domestic Energy Assessor
	Better Buildings Consultant
Date	22.09.24
Version	1

Copyright © 2025 Resolution Energy Ltd

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the author, except in the case of brief quotations embodied in critical reviews and certain other non commercial uses permitted by copyright law. For permission requests, contact:

Resolution Energy Ltd

3 Mount Pleasant, Furzeley Road, Denmead, Hampshire PO7 6TY

Email: claire@resolutionenergy.co.uk Tel: 07806 286338

Contents

Contents	2
Executive summary.....	4
1. Development Details.....	5
1.1. Schedule of accommodation.....	5
2. Policy.....	6
2.1 National context.....	6
2.1.1 Climate Change Act	6
2.1.2 National Planning Policy Framework	6
2.2 Local planning policy requirements	6
2.3 The Building Regulations Part L	8
2.4 The Future Homes Standard	8
3. Energy Strategy	9
3.1 The energy hierarchy.....	9
3.2 Methodology.....	9
3.3 Performance in use.....	10
3.3.1 Performance Gap	10
3.4 Demand reduction	10
3.4.1 Passive design measures	10
3.4.2 Active measures: energy efficient services	12
3.5 Overheating and cooling.....	14
3.5.1 Introduction to overheating.....	14
3.5.2 Overheating risk and mitigation.....	14
3.5.3 Proposed approach	15
3.6 Efficient heating infrastructure (Be Clean).....	18
3.6.1 Heat networks and communal heating systems.....	18
3.6.2 Gas fired boilers	18
3.6.3 Electric heating.....	19
3.7 Renewable energy technologies (Be Green).....	19
3.7.1 Heat pumps	19

3.7.2	Photovoltaic panels	22
3.7.3	Solar thermal systems	26
3.8	Summary of energy modelling	26
4.	Sustainability Statement	27
4.1	Water efficiency	27
4.2	Electric vehicle charging	29
4.3	Materials & waste	29
4.4	Climate resilience	31

Table of figures

Figure 1	The Energy Hierarchy	9
Figure 2	Fabric specification	11
Figure 3	Overheating risk and potential approaches to mitigation	15
Figure 4	Ventilation requirements daytime (Source: Venta Acoustics NIA)	16
Figure 5	Ventilation requirements nighttime (Source: Venta Acoustics NIA)	17
Figure 6	Carbon emission reduction – heat pumps only	21
Figure 7	Kings Copse Avenue – Indicative PV areas	23
Figure 8	Kings Copse Avenue – Indicative PV roof layout	23
Figure 9	Carbon emission reduction – heat pumps with solar PV arrays	25
Figure 10	Sanitary ware specification	28
Figure 11	Water efficiency calculator	28

Executive summary

This report sets out the energy and sustainability strategy for the proposed residential development at Kings Copse Avenue, Hedge End, which comprises a total of 192 dwellings, including a mix of houses and flats.

The development has been designed to align with the Eastleigh Borough Council Local Plan policy DM2, which requires environmentally sustainable development, including a minimum 19% reduction in regulated carbon emissions compared to the 2021 Building Regulations, alongside the maximisation of on-site renewable energy generation.

The energy strategy for the site will incorporate a range of features, following the principle of the energy hierarchy. These will include:

- Passive demand reduction measures through improved insulation and air tightness to reduce heating demand.
- Active demand reduction measures via intelligent heating and hot water controls.
- Supply of heating through high efficiency systems including heat pumps which operate using electricity as a low-carbon energy source.
- Specification of renewable energy technologies in the form of roof mounted solar photovoltaic arrays.

SAP-based energy modelling for representative house and flat types demonstrates that the combined effect of these measures will deliver an average site-wide reduction in regulated carbon emissions of 92% compared with the Part L 2021 baseline. This exceeds the policy requirement and confirms that the proposed strategy is both technically robust and policy compliant.

Further sustainability measures have been incorporated to ensure the development minimises environmental impacts and is resilient to future climate change. These include water efficiency measures, resource efficient design and sustainable construction methods.

1. Development Details

The proposed development is located at Kings Copse Avenue, Hedge End and consists of the delivery of a total of 192 new dwellings. The dwellings comprise a mixture of flats and houses.

This report and the associated energy modelling have been prepared with reference to the site plan, floor plans and elevations prepared by MH Architects.

The Energy and Sustainability Statement presents the proposed approach for the energy strategy and wider sustainability measures such as water efficiency, material efficiency and sustainable construction.

1.1. Schedule of accommodation

The proposed development will provide the following residential accommodation:

Type		Position	Number of type	Beds	Storeys	Floor area (m ²)
Flats						
Flat	2 bed	Ground floor	8	2	1	70.09 -74.37
Flat	1 bed	Ground floor	14	1	1	50.02 - 53.14
Flat	2 bed	Mid floor	18	2	1	70.09 -74.37
Flat	1 bed	Mid floor	28	1	1	50.02 - 53.14
Flat	2 bed	Top floor	14	2	1	70.09 - 71.56
Flat	1 bed	Top floor	8	1	1	50.25
Houses						
House	BB	Semi / end terrace	20	2	2	79.76
House	BB	Mid terrace	14	2	2	79.76
House	B	Mid terrace	5	2	2	79.76
House	GG	Detached / link detached	9	3	2	103.49
House	I	End terrace	8	3	2.5	111.62
House	NN	Semi / end terrace	17	3	2.5	113.65
House	TT	Detached / link detached	14	4	3	131.65
House	J	Link detached	4	4	3	131.65
House	UU	Detached / link detached	8	4	3	131.65
FOG	W	Detached / end of terrace	3	2	2	73.57
Site			192			

2. Policy

The following policy guidance has informed the development of the energy and sustainability strategy for the proposed development at Kings Copse Avenue, Hedge End.

2.1 National context

2.1.1 Climate Change Act

The Climate Change Act (2008) forms the basis for the UK's approach to tackling and responding to climate change. It requires both that emissions of carbon dioxide (CO₂) and other greenhouse gases are reduced, and that climate change risks are prepared for. The Climate Change Act was revised in October 2019 to require that *"the net UK carbon account for the year 2050 is at least 100% lower than the 1990 baseline"*, effectively setting a target for 'net zero carbon' to be achieved by 2050.

2.1.2 National Planning Policy Framework

The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied. In terms of climate change and sustainability, the NPPF provides the following guidance:

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure"

2.2 Local planning policy requirements

The Eastleigh Borough Council Local Plan 2016-2036 details the Local Planning Authority's requirements in respect of managing carbon emissions from the built environment.

Policy DM2 Environmentally sustainable development

1. The Borough Council requires that:

- a. all new build residential development (C3 Use Class only) must achieve at the time a Reserved Matters or Full Planning Application is submitted:
 - i. a 19% improvement in predicted carbon emissions, compared with the building regulations standard current at the time, through increased energy efficiency of the building fabric, unless this is superseded by an updated building regulations requirement equivalent to 'zero carbon homes'; and
 - ii. a predicted mains water consumption of no more than 110 litres/person/day.
- b. all other development that is above 500 sq.m of floorspace measured externally (including extensions and conversions to existing buildings) must achieve BREEAM 'excellent' (or equivalent) or BREEAM 'very good' plus 'passivhaus' certification including a 15% improvement in predicted carbon emissions, compared with the building regulations

current at the time, through low or zero carbon energy generation on site or in a Borough location agreed by the Council.

c. all other larger developments above 10,000 sq.m of floorspace should also seek to fund post occupancy evaluation (POE) in addition to the above.

2. In addition to the above, all development above 500 sq.m of floorspace measured externally (including extensions and conversions to existing buildings) and external spaces within the curtilage serving developments of this size should where practical and viable:

a. incorporate energy-efficient passive design principles, the best use of natural daylight and natural ventilation systems wherever possible;

b. connect to any existing near or adjacent low carbon local energy network unless this is proved unviable;

c. use recycled, low embodied carbon, low environmental impact and locally sourced materials in construction where possible;

d. be designed with sufficient flexibility to enable the life of the building to be extended by re-use for other purposes where feasible;

e. aim to deliver at least 1% of all residential units within the whole scheme which achieve full 'passivhaus' certification

Policy DM3, Adaptation to climate change

1. All development should be designed to adapt to the predicted climate change impacts for the Borough.

a. To reduce the potential impacts of surface water flooding, sustainable drainage systems need to be implemented as part of an integrated SuDS strategy for the site in accordance with policy DM6 (Sustainable surface water management and watercourse management) and as part of the landscape framework for the site including green open space and green roofs where appropriate.

b. New development should have a cooling strategy which can include:

i. cooling through generous green infrastructure and trees

ii. areas of shade

iii. water cooling

iv. building design and orientation to reduce overheating

v. 'cool roofs' or green roofs and green walls

vi. porous cool pavements

c. To adapt to water stress, new development should be designed to reduce demand. Measures can include:

- i. reduced residential mains water consumption (as per policy DM2)
- ii. water efficient appliances, fittings and leak detection devices for non-residential and non C3 use class residential development
- iii. rainwater harvesting and grey water recycling
- iv. drought resistant landscape design and planting

The Energy Statement sets out how the proposed development will respond to these national and local planning policy requirements in respect of energy performance and sustainable design. Details have been provided as to how the 19% reduction in carbon emissions will be delivered for the residential dwellings.

2.3 The Building Regulations Part L

The Building Regulations Approved Document Part L (AD Part L), Conservation of Fuel and Power, governs the energy performance standards that all new buildings are required to meet. At the time of preparation of this report and the supporting energy modelling, the current version of Part L applicable to new development is Part L 2021.

For each low carbon technology that has been considered, results are presented for the TER 'Target Emission Rate' and DER 'Dwelling Emission Rate'. The TER sets the maximum allowable carbon emissions for the dwelling (the baseline), while the DER shows the carbon emissions as a result of the proposed energy strategy.

2.4 The Future Homes Standard

A new regulatory framework known as the 'Future Homes Standard' is expected to be introduced by the Government in 2026, setting enhanced standards for energy performance for new build dwellings.

The definitive technical specification has yet to be finalised, however, based on consultation documents and Government announcements the following key elements are anticipated to be required:

- Homes which achieve a 75–80% reduction in carbon emissions compared with 2013 Part L standards.
- Building fabric standards broadly in line with the current requirements of Part L 2021.
- Use of low carbon heat sources such as heat pumps (gas fired heating will no longer be permitted).
- Installation of solar PV panels to all roofs except in exceptional circumstances such as highly shaded spaces.

The specification for Kings Copse Avenue has been developed in anticipation of the principles required by the Future Homes Standard. Details within the report such as sizes of photovoltaic (PV) arrays should be seen as indicative until such time as the full technical specification for the Future Homes Standard is published.

3. Energy Strategy

3.1 The energy hierarchy

The energy hierarchy sets out the key measures that should form part of an energy strategy for any new building or development, in order of their priority. Reducing energy demand is at the top of the hierarchy, followed by supplying energy efficiently, finally supplying remaining energy needs from renewable energy sources.

In line with best practice, the energy strategy for the Proposed Development has been set out in accordance with the structure of the energy hierarchy.

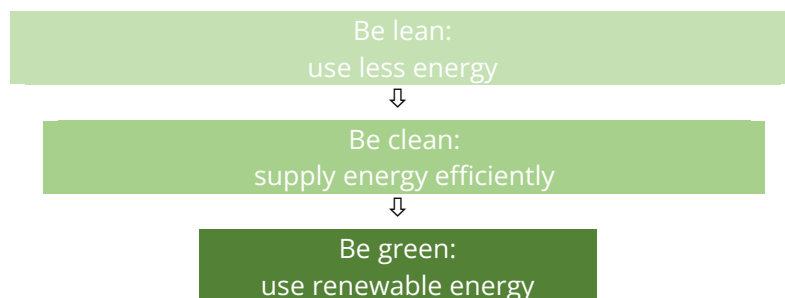


Figure 1 The Energy Hierarchy

The strategy for the proposed development aims to reduce energy demand, to use energy in an efficient way, and to use sources of renewable energy to meet demand.

3.2 Methodology

In order to confirm compliance with the Planning Policy requirements, comprehensive energy modelling has been undertaken for the proposed development. This has been based on a sample of representative dwelling types. Dwelling types have been selected to reflect the various factors which will affect energy performance. These include:

- Dwelling size (floor area)
- Attachment (detached / semi-detached)
- Position within block (for flats)
- Number of storeys
- Orientation

Energy modelling has been carried out using the Building Research Establishment's (BRE) SAP methodology by an accredited On Construction Domestic Energy Assessor. This has informed the outline specification for the various elements of the buildings. SAP modelling has been undertaken in SAP10 to reflect the version of Building Regulations Part L applicable at the time of the application.

Energy modelling has been undertaken to confirm:

- The carbon emission baseline for a development compliant with the minimum standards of the Building Regulations (a Part L 2021 baseline).
- The reduction in carbon emissions from suitable renewable / low carbon energy sources.
- The total reduction in carbon emissions as a result of the proposed energy strategy.

Full SAP modelling of each individual dwelling will be undertaken at the relevant stage as part of the Building Regulations application for the scheme. The approaches listed in the report are based on commercially available technologies tested and approved for use in the SAP software, and considered suitable for a larger scale development.

3.3 Performance in use

While energy modelling is an important tool to determine compliance with planning policy targets and building standards, energy performance in use reflects the real-world energy efficiency of a building once occupied and operational.

3.3.1 Performance Gap

Research has demonstrated that there can sometimes be a difference between the modelled energy performance of new dwellings, and their actual energy consumption in use. This is known as the 'Performance Gap'. This can be caused by various factors. To minimise the risk of this, attention will be given to ensuring a high standard of quality control on site with respect to items such as thermal bridging, air tightness and commissioning of building services. The Site Manager will be responsible for collating photographs of both insulation details and building services, in line with requirements of Part L.

3.4 Demand reduction

Using the approach of the energy hierarchy, the first stage of the approach to developing the energy strategy has consisted of identifying suitable approaches to reduce energy demand. Measures to reduce the energy demand can be classified as either 'passive' or 'active'. Passive design measures are those such as site layout, solar gain and solar shading, insulation to reduce heat loss, thermal bridging and air tightness. These measures are 'built in' to the design of new dwellings.

'Active' design measures relate to the specification of energy efficient services such as lighting and ventilation. These will be replaced during the lifetime of the home. Measures that help the building occupant to optimise the use of their space heating and hot water supply are also considered here.

3.4.1 Passive design measures

Site layout and building orientation is important to achieve a balance between useful solar gain, which can reduce the energy demand of the building, whilst avoiding the potential for overheating from excessive solar gain.

Although planning policy DM2 encourages the provision of 1% of dwellings to be Passivhaus-certified, this is not considered practical for the proposed development. Instead, the strategy for demand reduction will focus on incorporating a range of design and efficiency elements to ensure energy performance and sustainability are effectively addressed.

Building fabric

The building fabric consists of the various elements of the envelope of the building through which heat is lost. These include the floor, walls, roof windows and doors. The design of the thermal envelope of the building can have the greatest influence on the energy demands of the building, and while services will be replaced several times over the building's lifespan, the fabric of the building envelope typically remains more constant. The building fabric is also always more difficult to retrospectively improve in terms of thermal efficiency.

Using the 'fabric first' approach, all components of the thermal envelope for the proposed dwelling types have been reviewed by the design team. This has identified opportunities to improve insulation levels to deliver a high-performance thermal envelope. Heat loss through these elements is defined by the U-value, with a lower U-value representing a better level of thermal performance. The outline specification for the thermal envelope across the various house types is as follows:

Thermal element	Houses	Flats
	U-values	U-values
Floor	0.11-0.12	0.11-0.12
Walls	0.17	0.16
Walls to communal areas	n/a	0.18
Roof	0.10 (joists) 0.12 (rafters)	0.12 (flat)
Windows	1.10 g-value 0.50	1.10 g-value 0.50
Doors	1.00	1.00

Figure 2 Fabric specification

For windows, careful consideration should be given not just to the U-value, but also to the G-value which relates to solar transmittance. While solar gain is useful during the heating season to reduce fossil fuel use by the primary heating system, excess solar gain during the summer can lead to buildings becoming uncomfortably hot.

In terms of thermal mass, it is anticipated that houses will be of timber frame construction. While this construction method allows for high levels of insulation and airtightness, the lightweight nature of the building materials can potentially increase overheating risk if not balanced by design features such as cross ventilation, solar control and suitably sized glazed openings.

Flats are envisaged to be of masonry construction. The higher thermal mass of materials such as concrete allows the building to respond to changes in temperature by absorbing, storing and releasing heat in response to changes in internal and external temperatures.

Overheating strategies are explored in more depth in later stages of this report.

Thermal bridging

As the heat loss through each of the elements in the building is reduced through the specification of lower U-values, the heat loss at the junctions of each of these elements becomes much more significant. This process is known as thermal bridging and is measured using the Ψ value. For the purposes of the Planning stage energy strategy the following details have been used:

- Houses (timber frame construction) – typical timber frame ψ values have been used, resulting in an overall target Ψ value of $\sim 0.06\text{W/m}^2\text{K}$.
- Flats (masonry construction) - 'Recognised Construction Details' ψ values have been used, resulting in an overall target Ψ value of $\sim 0.08\text{W/m}^2\text{K}$.

As the detailed design progresses each thermal bridge junction will be reviewed by the Design Team to determine suitable construction details that can be used to reduce heat loss. To ensure that thermal bridging details are followed effectively on site, a process of sign-off checklists for Contractors is also proposed.

Air tightness

Air tightness is a measure of the air leakage from a dwelling, uncontrolled exchange of air between the internal and external environment leads to unwanted heat loss. To minimise heat loss in this way, a target has been set for air tightness of $4\text{ m}^3/\text{h.m}^2$. Full testing will be carried out for each dwelling within the proposed development to confirm that this target is achieved on completion of the build.

3.4.2 Active measures: energy efficient services

Lighting

High efficiency lighting will be specified in order to reduce energy consumption for both internal and external lighting. Lighting will be LED fittings, providing an efficacy of 75 lumens per circuit watt as a minimum.

Externally lighting will be controlled with photocell and PIR sensors to ensure it is only operational during hours of darkness and in response to demand.

Heating controls

Space heating will be controlled through the provision of timers, thermostats and thermostatic radiator valves (TRVs). For larger dwellings heating controls will also be zoned in order to provide more flexibility for heating certain areas of the home in response to demand.

Consideration will also be given to any additional heating controls that have the potential to further reduce demand, such as delayed start thermostats and weather compensation.

Water efficiency

The specification of water efficiency measures has the potential to not only reduce water use, but also to reduce the energy needed to provide domestic hot water. As space heating demands are decreased through higher standards of fabric efficiency, energy for hot water needs in new build homes are often higher than those for space heating. In particular, the shower flow rate has the potential to offer substantial energy savings and this has been accounted for in the supporting energy modelling.

Hot water demand will be reduced through the specification of:

- Flow restrictors to wash hand basin taps
- Smaller capacity baths
- Shower flow restrictors

Water efficiency measures are considered in more detail in section 4.0.

Ventilation

Efficient ventilation to enable air pollutants and moisture to be removed from the building, and fresh air to be provided, is essential to ensure that occupants have a healthy, comfortable internal environment, and that levels of moisture within the building do not have the potential to cause condensation.

Building designs have been optimised to allow for natural ventilation through provision of cross ventilation (openings on opposite sides of the building), and openable windows where possible.

The ventilation strategy will largely be determined by the acoustic requirements of the site. For certain house types the Noise Impact Assessment indicates that windows may not be able to be left open for long periods for ventilation purposes. For these house types whole house mechanical ventilation will be required to ensure that a comfortable temperature and level of air quality is maintained.

For house types without acoustic constraints, natural ventilation via openable windows is the preferred option. These house types will be ventilated with decentralised continuous extract systems to wet rooms, appropriate for their target level of air tightness. This type of ventilation provides an efficient continuous low level of background ventilation. Fans will have a humidity sensor to ensure that they respond to peak times of moisture generation such as cooking and showering.

Demand side response

Further measures to reduce demand will include the provision of smart meters and home user guides to aid occupants to reduce their energy use. Smart meters provide real time data on energy consumption via an energy display device, allowing residents to see their energy use, associated carbon emissions and running costs. This allows occupants to have greater control of their energy use, rather than relying on estimated meter readings for billing.

Smart meters will also allow occupants to make use of smart tariffs, where energy prices are variable, and offering the opportunity to use energy at a lower cost at times of lower demand or excess generation.

A home user guide will be provided to new occupants to ensure that they have adequate information to enable them to operate heating, hot water, ventilation and lighting systems in the most cost-effective manner.

3.5 Overheating and cooling

3.5.1 Introduction to overheating

Overheating is a term used to describe a situation where the temperature in a home becomes excessively warm for prolonged periods of time. Overheating occurs when internal and external thermal gains exceed the ability for excess heat to be removed. This can cause discomfort for residents, particularly if they have underlying health conditions or are vulnerable due to their age. It also means that occupants may resort to using active cooling systems such as air conditioning which will increase energy use and associated carbon emissions. Climate change will bring altered weather patterns which will also increase the risk of overheating in buildings in future years.

3.5.2 Overheating risk and mitigation

Overheating risk in buildings is caused by a number of factors and their interaction. Key factors and potential mitigation measures that will be considered through the design process are set out in the table below:

Element	Points to consider	Potential mitigation measures
Site context	Local microclimate, hard and soft landscaping Shading offered by adjacent buildings, structures and natural features such as trees Local air and noise pollution	Maximise soft landscaping Tree planting Noise attenuation measures Appropriate ventilation strategy where windows can't be left open
Internal heat gains	Heat gains from occupants and their daily activities such as cooking and showering	Ventilation strategy to adapt to times of peak use through occupancy / humidity sensor Lower flow rate showers to reduce hot water spray
	Unwanted heat gains from building services, such as hot water cylinders, distribution pipework Lighting	Hot water cylinder insulation to reduce unwanted heat gains, particularly where cylinder cupboards are in close proximity to bedroom Appropriate position of hot water cylinder to avoid excessive pipe runs

		Pipework insulation LED light fittings and controls
Building design	Thermal mass	Consideration of thermal mass appropriate to building type
	Insulation	Improved efficiency of the thermal envelope to reduce unwanted heat gains, particularly for house types with 'rooms in the roof'
	Air tightness	Ensuring that the ventilation strategy is appropriate to target air tightness level
External solar gains	Reducing excessive solar gains Glazed areas and orientation	Glazing design including window size, orientation and G-value (thermal transmittance) Depth of window reveals and frame factor
Removing excess heat	Ventilation strategy	Openable windows where possible Internal layouts allowing for cross ventilation Mechanical ventilation where required
		Mechanical cooling is not proposed
Occupant behaviour	Ensuring that occupants understand the strategy for their home	Provision of a 'Home User Guide' providing advice in non-technical language, including: - Times of day to use different approaches - How to service and maintain ventilation systems - Locations of controls

Figure 3 Overheating risk and potential approaches to mitigation

3.5.3 Proposed approach

The emphasis for overheating mitigation at Kings Copse Avenue will be to take a passive approach wherever possible. The full overheating strategy will be subject to the results of detailed modelling during the design stage where software will be utilised to simulate solar gain, internal heat gains, and ventilation effectiveness. All modelling will be undertaken using the standards set out in the Building Regulations Part O and CIBSE TM59: Design methodology for the assessment of overheating risk in homes.

The Noise Impact Assessment (NIA) for the site confirms that certain dwellings cannot rely on openable window for ventilation and therefore will require a mechanical means of ventilation. In addition, any types with ground floor bedrooms (ground floor flats) will also require a means of mechanically ventilating bedrooms if windows cannot be securely left open during sleeping hours.

The following extracts from the NIA demonstrate (in red) the areas of the development where an alternative ventilation solution will be required.



Figure 4 Ventilation requirements daytime (Source: Venta Acoustics NIA)

For Part O compliance the maximum night time noise events control whether or not openable windows are a realistic solution for night time purge ventilation. The zones of the site where this is applicable are indicated on the NIA extract below:

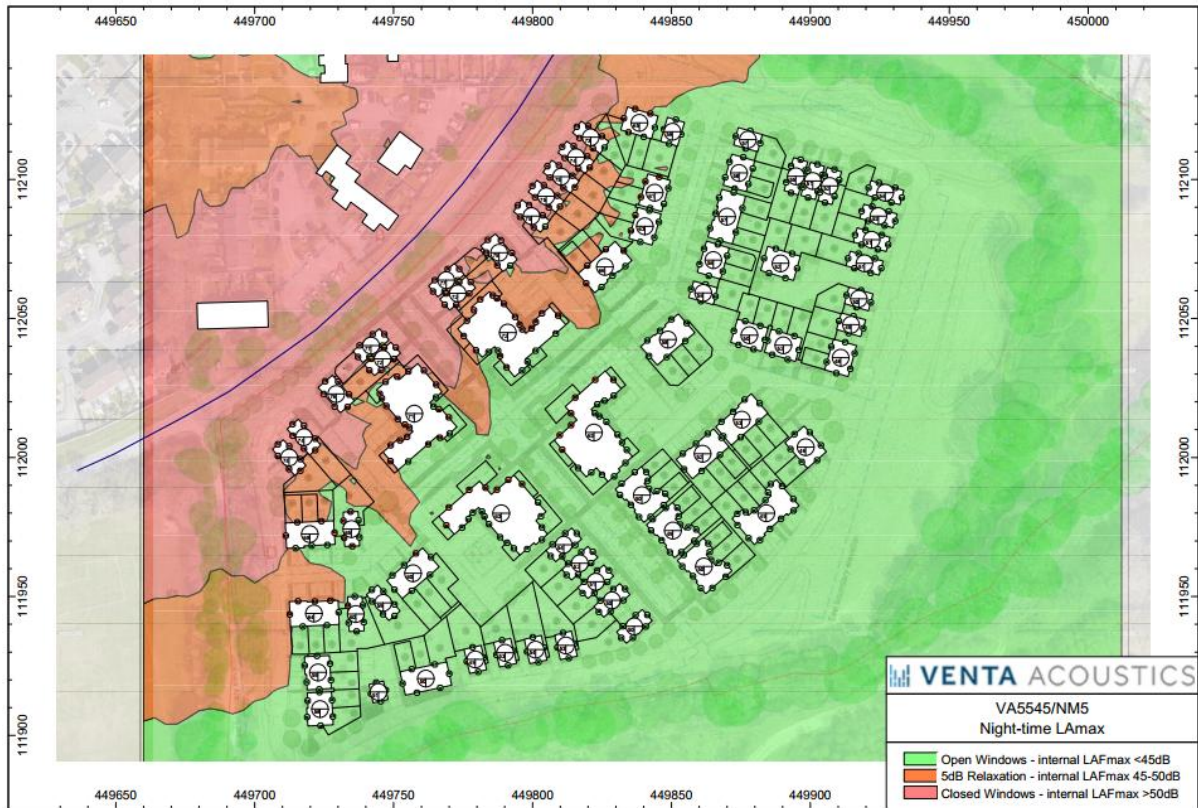


Figure 5 Ventilation requirements nighttime (Source: Venta Acoustics NIA)

At this stage it is anticipated that the design features that will be incorporated into the design to mitigate the risk of overheating will include:

- Tree planting and soft landscaping to provide shading and temperature regulation of the local microclimate around buildings.
- High-performance insulation to prevent unwanted heat gain.
- A low window g-value of 0.50 to reduce unwanted solar gain. A further reduced g-value may be needed for flats, subject to overheating modelling results.
- The majority of windows to be openable, facilitating natural ventilation, except where restricted due to acoustic constraints (zones shown in red).
- All house types having cross ventilation, promoting natural airflow to reduce internal temperatures.
- Air-tight construction to prevent hot air infiltration, with controlled continuous ventilation.
- Whole house mechanical ventilation for any house or flat types where windows remain closed for acoustic / security reasons.
- Well insulated hot water cylinders and hot water distribution pipework to prevent unwanted heat gains.
- Humidity controls to ventilation systems to increase ventilation rate during times of moisture / heat generation.
- No mechanical cooling is anticipated.

3.6 Efficient heating infrastructure (Be Clean)

Once demand for energy has been minimised, options for supplying energy efficiently and cleanly can be explored. This will reduce not only carbon dioxide (CO₂) emissions, but also oxides of nitrogen (NO_x) which both impact on local air quality.

3.6.1 Heat networks and communal heating systems

Space heating and domestic hot water can be provided through communal systems. This can take the form of either connection to an existing district heating network, or provision of a new network, at either a site wide or building level.

Communal systems can, depending on the heat source, provide improved efficiencies in heat generation compared to individual systems, however this has to be considered alongside the distribution losses that occur as heat is transported around the network. Further areas to consider are metering and billing and long-term maintenance of the plant and network.

No district heating infrastructure is present in the surrounding area to enable connection of the proposed development.

It is considered that individual heating systems are a more appropriate way of providing space heating and hot water. With the enhancements to building fabric described above, alongside active demand reduction measures, energy required for space heating will be low and can be met efficiently by individual heating systems such as heat pumps.

Combined heat and power (CHP)

Combined heat and power (CHP) is a process which utilises the heat that is a by-product of electricity generation. CHP is typically gas fired, and compared to producing electricity via a gas fired power station can offer carbon emission reductions of around 30%. CHP is typically used in conjunction with a district heating scheme, and operates most efficiently when there is a mixed profile of residential and non-residential buildings, and a high and consistent demand for hot water.

In recent years there has been a substantial reduction in the carbon emissions associated with electricity from the national grid. A significant proportion of electricity is now provided from low carbon sources such as wind, solar, hydro and nuclear energy. This means that the carbon intensity of electricity produced locally by CHP plant, would actually be higher than that supplied from the national grid. As such it is not proposed that CHP will form part of the overall energy strategy.

3.6.2 Gas fired boilers

Although compliance with current Building Regulations is possible using gas fired boilers, it is anticipated that their use in new build development will be phased out from 2026 onwards when the Future Homes Standard is implemented. Carbon emissions from gas fired systems would be significantly higher than those from electrically fuelled systems.

In line with the future direction away from the use of gas boilers, it is not proposed that these are used as the primary heating system for the development. A lower carbon system is considered to be a more appropriate and future-proofed solution.

3.6.3 Electric heating

Electric heating systems, such as electric boilers or individual heaters, could potentially be suitable, particularly for smaller dwelling types such as 1 and 2 bed units. As these heating systems are fuelled by electricity, they will have low associated CO₂ emissions due to the low carbon intensity of electricity supplied through the grid. However, due to the high current costs of electricity they do have the potential to be expensive to run, even with a good standard of fabric efficiency. Direct electric heating and hot water systems also place a high demand on the local grid for supply at peak times, particularly when seen in conjunction with the increased demand for electric vehicle charging.

For the majority of house types it is considered that lower carbon systems such as heat pumps are more appropriate as they offer the benefit of both lower demand on the local grid, as well as lower running costs for occupants. However, for the 1 and 2 bed flats, direct electric space heating used in conjunction with a hot water heat pump is a suitable solution. This is considered in more details under 'renewable technologies'.

3.7 Renewable energy technologies (Be Green)

A number of renewable energy technologies have been considered for the site in order to contribute to the planning policy requirement of a 15% improvement in predicted carbon emissions, compared with the Building Regulations current at the time, through low or zero carbon energy generation. For the Kings Copse Avenue development this will be delivered on site.

3.7.1 Heat pumps

Heat pumps are devices which extract heat from a heat source such as the ground (ground source heat pumps) or the air (air source heat pumps). The heat pump then raises the temperature of the fluid which is supplied to the building for domestic heating and hot water. In order to operate most efficiently, heat pumps systems generally require an under-floor heating system or oversized radiators.

In terms of the heat source, ground source heat pumps are typically slightly more efficient than air source heat pumps, as the ambient ground temperature is more constant. However, the proposed layout lacks the space required for a ground array in trenches within each private garden. While vertical boreholes are an option, the additional cost of preparing and drilling the borehole has led the energy strategy in the direction of air source heat pumps as a more suitable solution.

Air source heat pumps (ASHP) have the potential to achieve a good reduction in terms of CO₂ emissions, and are well suited to the proposed development due to the high standard of fabric efficiency. Energy modelling has been undertaken on the basis of an ASHP supplying both space heating and domestic hot water demand to each individual dwelling. Consideration needs to be given to their location to avoid noise and visual impacts, and sizing to achieve a good co-efficient of performance. Acoustic impact has been considered in the Noise Impact Assessment which confirms that noise levels for the proposed ASHP locations fall within acceptable limits.

A hot water only heat pump is another potential solution, that can be combined with electric space heating, to provide a low carbon source of energy. This is typically suitable for flats, where hot water demand is often in excess of demand for space heating, and layouts limit the use of air source heat pumps.

SAP modelling has been undertaken based on the following specifications:

- Houses: Air source heat pumps to all house types
- Flats: Electric heating with hot water heat pump

The SAP modelling confirms that heat pumps have the potential to provide well in excess of the Eastleigh Borough Council target of a 15% improvement in predicted carbon emissions. On a site wide average basis, specification of heat pumps will provide a 62.79% reduction compared to the current Building Regulations. This equates to an annual saving of 119 tonnes of CO₂. An energy modelling summary is presented in Figure 6 below.

Type (modelled)	Plot	Similar type (not modelled)	Type		Beds	Storeys	Floor area m ²	Number of type	Baseline CO ₂ emissions (per dwelling) tonnes / yr	Baseline CO ₂ emissions (total for type) tonnes / yr	Air source heat pump	Cylinder l	CO ₂ emissions (per dwelling) tonnes / yr	CO ₂ emissions (total for type) tonnes / yr	Reduction over baseline %	DER / TER (1) %	DPER / DPER (2) %	DLEE / TFEE (3) %
C2	2		Flat	Ground floor	2	1	70.43	1	1.02	1.02	Hot water HP	180	0.44	0.44	56.41%	56.41%	15.41	5.96
		C3,5, B2,3,5 A5, D5	Flat	Ground floor	2	1	70.43	7	1.02	7.11			0.44	3.10				
C4	4		Flat	Ground floor	1	1	50.25	1	0.75	0.75	Hot water HP	150	0.29	0.29	61.63%	61.63%	25.79	3.45
		C1, B1,4 A1,2,3,4,6 D1,2,3,4,6	Flat	Ground floor	1	1	50.25	13	0.75	9.81			0.29	3.76				
C7	7		Flat	Mid floor	2	1	70.43	1	0.86	0.86	Hot water HP	180	0.36	0.36	58.49%	58.49%	19.59	3.27
		C8,10,11,13,14,17 B7,8,10,11,13,14,17 A12,19, D12,19	Flat	Mid floor	2	1	70.43	17	0.86	14.60			0.36	6.06				
C9	9		Flat	Mid floor	1	1	50.25	1	0.66	0.66	Hot water HP	150	0.23	0.23	65.72%	65.72%	33.42	-4.25
		C6,15, B6,9,15 A7,8,9,10,11,13-18 D7,8,9,10,11,13-18	Flat	Mid floor	1	1	50.25	27	0.66	17.73			0.23	6.08				
C18	18		Flat	Top floor	2	1	70.43	1	1.13	1.13	Hot water HP	180	0.51	0.51	54.93%	54.93%	12.72	7.7
		C16,19,21 B16,18,19,21 A21,22,24 D21,22,24	Flat	Top floor	2	1	70.43	13	1.13	14.75			0.51	6.65				
C20	20		Flat	Top floor	1	1	50.25	1	0.81	0.81	Hot water HP	150	0.31	0.31	61.80%	61.80%	26.06	6.41
		C12, B12,20 A20,23, D20,23	Flat	Top floor	1	1	50.25	7	0.81	5.68			0.31	2.17				
BB	8		House	Semi / end terrace	2	2	79.76	20	0.91	18.22	5kW	150	0.39	7.72	57.62%	57.62%	14.29	3.18
BB	7		House	Mid terrace	2	2	79.76	14	0.83	11.66	5kW	150	0.36	5.06	56.61%	56.61%	11.73	4.07
		B	House	Mid terrace	2	2	79.76	5	0.83	4.16			0.36	1.81				
GG	66		House	Detached / link detached	3	2	103.49	9	1.23	11.07	7kW	200	0.41	3.72	66.41%	66.41%	33.01	1.62
I	35		House	End terrace	3	2.5	111.62	8	1.19	9.54	7kW	200	0.41	3.28	65.64%	65.64%	31.24	2.89
NN	6		House	Semi / end terrace	3	2.5	113.65	17	1.19	20.31	7kW	200	0.40	6.80	66.51%	66.51%	32.96	2.16
TT	13		House	Detached / link detached	4	3	131.65	14	1.42	19.92	10kW	250	0.42	5.86	70.58%	70.58%	41.31	0.55
		J	House	Link detached	4	3	131.65	4	1.42	5.69			0.42	1.67				
UU	102		House	Detached / link detached	4	3	131.65	8	1.46	11.71	10kW	250	0.43	3.41	70.86%	70.86%	42.02	1.33
W	100		FOG	Detached / end of terrace	2	2	73.57	3	0.84	2.52	5kW	150	0.44	1.32	47.86%	47.86%	-2.29	3.27
Site	Site wide							192		189.71				70.60	62.79%			

- (1) Dwelling Emission Rate / Target Emission Rate
(2) Dwelling Primary Energy Rate / Target Primary Energy Rate
(3) Dwelling Fabric Energy Efficiency / Target Fabric Energy Efficiency

Figure 6 Carbon emission reduction – heat pumps only

3.7.2 Photovoltaic panels

Photovoltaic (PV) panels use PV modules to convert sunlight to electrical power. The DC current generated is converted to AC current for use within the building via an inverter. While energy is being produced during daylight hours, this will be used to meet any demand that exists within the home for electrical appliances, lighting or ventilation. Any surplus energy will flow to the national grid.

PV panels are a long established and proven technology, with a typical lifespan of around 25 years. Their maintenance is very minimal and the building occupant does not require a detailed understanding of their operation in order to benefit from their use.

It should be noted that although electricity generated locally from PV will have lower CO₂ emissions than that on average supplied through the national grid, this differential will not be substantial due to the rapid decarbonisation of the grid in recent years. Local provision of PV does however also have other significant benefits including:

- Reducing inefficiencies through transmission losses through the grid.
- Reducing demand on the grid at a local level, particularly at peak times.
- Protecting occupants from higher energy costs at a time of increasing energy costs.
- Contributing towards the demand for electric vehicle charging.

It is proposed that a solar photovoltaic (PV) array will be installed on the roof of each building within the development. The design intent has been to optimise the available roof space for renewable generation, with array sizing determined by roof orientation, pitch, shading, and the unobstructed area of each roof type. The majority of PV arrays are orientated South (including South-East and South-West) to maximise solar irradiance and energy yield. Where site layouts necessitate East or West facing panels, an increased PV allowance has been included to compensate for the slightly lower expected generation from these orientations. For flats a larger centralised PV array will be provided to the flat roof of each block. The proposed locations for the PV arrays are shown in Figure 8.

Indicative PV capacities for each house type are provided in Figure 7, expressed in kilowatt-peak (kWp). The arrays will be designed to connect to the building electrical distribution via inverters, operating in parallel with the grid to offset on-site electricity demand and minimise transmission losses.

EBC name	Type	Type	PV (kWp) where S / SE / SW	PV (kWp) adjusted for other orientations	Panel size (W)	Number of panels	Panel size (m ²)	Panel area (m ²)
B	2B4P	House	3.54	n/a	400	8.86	1.70	15.07
BB	2B4P	House	3.54	4.43	400	8.86	1.70	15.07
GG	3B6P	House	3.99	4.99	400	9.98	1.70	16.96
I	3B6P	House	4.45	5.56	400	11.11	1.70	18.89
J	4B8P	House	4.57	n/a	400	11.42	1.70	19.42

NN	3B6P	House	3.98	4.97	400	9.94	1.70	16.91
TT	4B8P	House	4.57	5.71	400	11.42	1.70	19.42
UU	4B8P	House	4.56	5.70	400	11.40	1.70	19.39
W	2B4P	FOG	3.03	3.79	400	7.57	1.70	12.87
Block B		Flats	29.95	n/a	400	74.87	1.70	127.28
Block C		Flats	29.95	n/a	400	74.87	1.70	127.28
Block A		Flats	29.65	n/a	400	74.14	1.70	126.03
Block D			29.65	n/a	400	74.14	1.70	126.03

Figure 7 Kings Copse Avenue – Indicative PV areas



Figure 8 Kings Copse Avenue – Indicative PV roof layout

SAP modelling indicates that the proposed provision of solar PV arrays will deliver a measurable reduction in carbon emissions. Across the development, the combined specification of PV systems and heat pumps is projected to achieve a 91.89% reduction in regulated CO₂ emissions relative to the current Part L baseline of the Building Regulations. This represents a total estimated annual saving of 174 tonnes of CO₂ compared with a development constructed to the minimum regulatory standards. The modelling incorporates site-specific assumptions regarding

PV array size, orientation, solar irradiance, and system efficiency, alongside the performance characteristics of the heat pump installations. A summary of the energy modelling outputs is included in Figure 9 below.

Type (modelled)	Plot	Similar type (not modelled)	Type		Beds	Storeys	Floor area m ²	Number of type	Baseline CO ₂ emissions (per dwelling) tonnes / yr	Baseline CO ₂ emissions (total for type) tonnes / yr	Air source heat pump	Cylinder l	CO ₂ emissions (per dwelling) tonnes / yr	CO ₂ emissions (total for type) tonnes / yr	Reduction over baseline %	DER / TER (1) %	DPER / DPER (2) %	DFEE / TFEE (3) %
C2	2		Flat	Ground floor	2	1	70.43	1	1.02	1.02	Hot water HP	180	0.29	0.29	71.93%	71.93%	38.15	5.96
		C3,5, B2,3,5 A5, D5	Flat	Ground floor	2	1	70.43	7	1.02	7.11			0.29	2.00				
C4	4		Flat	Ground floor	1	1	50.25	1	0.75	0.75	Hot water HP	150	0.18	0.18	75.88%	75.88%	46.8	3.45
		C1, B1,4 A1,2,3,4,6 D1,2,3,4,6	Flat	Ground floor	1	1	50.25	13	0.75	9.81			0.18	2.36				
C7	7		Flat	Mid floor	2	1	70.43	1	0.86	0.86	Hot water HP	180	0.20	0.20	77.19%	77.19%	46.34	3.27
		C8,10,11,13,14,17 B7,8,10,11,13,14,17 A12,19, D12,19	Flat	Mid floor	2	1	70.43	17	0.86	14.60			0.20	3.33				
C9	9		Flat	Mid floor	1	1	50.25	1	0.66	0.66	Hot water HP	150	0.13	0.13	80.41%	80.41%	15.06	-4.25
		C6,15, B6,9,15 A7,8,9,10,11,13-18 D7,8,9,10,11,13-18	Flat	Mid floor	1	1	50.25	27	0.66	17.73			0.13	3.47				
C18	18		Flat	Top floor	2	1	70.43	1	1.13	1.13	Hot water HP	180	0.35	0.35	68.84%	68.84%	33.21	7.7
		C16,19,21 B16,18,19,21 A21,22,24 D21,22,24	Flat	Top floor	2	1	70.43	13	1.13	14.75			0.35	4.60				
C20	20		Flat	Top floor	1	1	50.25	1	0.81	0.81	Hot water HP	150	0.21	0.21	74.18%	74.18%	44.1	6.41
		C12, B12,20 A20,23, D20,23	Flat	Top floor	1	1	50.25	7	0.81	5.68			0.21	1.47				
BB	8		House	Semi / end terrace	2	2	79.76	20	0.91	18.22	5kW	150	-0.01	-0.18	100.96%	100.96%	71.6	3.18
BB	7		House	Mid terrace	2	2	79.76	14	0.83	11.66	5kW	150	-0.03	-0.47	104.02%	104.02%	74.33	4.07
		B	House	Mid terrace	2	2	79.76	5	0.83	4.16			-0.03	-0.17				
GG	66		House	Detached / link detached	3	2	103.49	9	1.23	11.07	7kW	200	-0.02	-0.16	101.43%	101.43%	78.25	1.62
I	35		House	End terrace	3	2.5	111.62	8	1.19	9.54	7kW	200	-0.06	-0.52	105.43%	105.43%	82.21	2.89
NN	6		House	Semi / end terrace	3	2.5	113.65	17	1.19	20.31	7kW	200	-0.05	-0.83	104.09%	104.09%	81.98	2.16
TT	13		House	Detached / link detached	4	3	131.65	14	1.42	19.92	10kW	250	-0.05	-0.70	103.52%	103.52%	84.41	0.55
		J	House	Link detached	4	3	131.65	4	1.42	5.69			-0.05	-0.20				
UU	102		House	Detached / link detached	4	3	131.65	8	1.46	11.71	10kW	250	-0.05	-0.37	103.15%	103.15%	84.15	1.33
W	100		FOG	Detached / end of terrace	2	2	73.57	3	0.84	2.52	5kW	150	0.13	0.40	84.34%	84.34%	46.85	3.27
Site	Site wide							192		189.71				15.39	91.89%			
(1)	Dwelling Emission Rate / Target Emission Rate																	
(2)	Dwelling Primary Energy Rate / Target Primary Energy Rate																	
(3)	Dwelling Fabric Energy Efficiency / Target Fabric Energy Efficiency																	

Figure 9 Carbon emission reduction – heat pumps with solar PV arrays

3.7.3 Solar thermal systems

Solar thermal systems use roof mounted collectors to absorb the heat energy from the sun. This energy is then used to heat the domestic hot water for the dwelling within the hot water cylinder. Solar thermal systems are typically more suitable for houses than for flats.

Hot water demands have been reduced as far as possible through active demand reduction measures, and remaining demand will be met efficiently through heat pump systems. As these systems use electricity which is a low carbon fuel source, the contribution of solar thermal to further carbon reduction would be negligible.

The development has been designed to prioritise maximising the available roof space for PV installation. This will deliver a greater reduction in carbon emissions in comparison to using the equivalent roof space for solar thermal panels. On this basis, solar thermal is therefore not proposed to form part of the energy strategy for the site, ensuring that the chosen approach provides the most effective and practical means of achieving the development's sustainability and carbon reduction objectives.

3.8 Summary of energy modelling

In order to confirm that the proposed energy strategy will meet the requirements of both planning policy and the 2021 Building Regulations, energy modelling has been undertaken.

A range of measures will be implemented, following the principle of the energy hierarchy. These include:

- Passive demand reduction measures through improved insulation and air tightness.
- Active demand reduction measures through heating controls.
- Supply of heating through high efficiency heat pump systems.
- Specification of renewable energy technologies via solar PV arrays.

SAP modelling has been carried out for a representative sample of house and flat types, with further analysis planned post-planning to optimise the detailed specifications for each dwelling. The results of the energy modelling indicate that, compared with the baseline emissions defined by the 2021 Part L standards, carbon emissions across the development will be reduced by 91.89%. These findings demonstrate that the proposed energy strategy not only meets but exceeds the relevant planning policy requirements for on-site carbon emission reduction.

4. Sustainability Statement

The proposed development aims to provide new homes that are not only energy efficient in operation but are also resource efficient in terms of their construction. This section of the report presents additional aspects of the building design that relate to water efficiency, resource efficient design, sustainable construction and climate resilience.

Elements of the Local Plan policies which relate to sustainability in terms of issues such as biodiversity, transport, noise and drainage are covered in detail by additional reports submitted as part of the Planning Application.

4.1 Water efficiency

Water resources nationally are under increasing pressure from climate change and population growth. Implementation of water efficiency measures to reduce the water demand from the proposed development will have several benefits including:

- Reducing demand on a natural resource, which will increase in importance with changing climate and weather patterns.
- Decreasing the energy required to heat hot water for showers, baths and handwashing and therefore reducing carbon emissions.
- Minimising the volume of water that needs to be treated to drinking water standards and pumped to the development.
- Decreasing the volume of foul water generated, therefore reducing demand on waste water treatment (and associated energy use) and infrastructure.

With these benefits in mind water efficiency measures will be specified. Water consumption in residential dwellings is calculated with reference to The Building Regulations Approved Document Part G. This document sets out a methodology for calculating the water use per occupant per day, based on the flow rates and capacities of the sanitary ware fittings and water using appliances in the home.

New dwellings are currently required to achieve water demand of less than 125 litres per person per day. In accordance with the Planning Policy requirements of Policy DM2, an enhanced level of water efficiency is proposed to meet the optional higher performance standard of Approved Document Part G, 110 litres per person per day.

The following summary table sets out typical flow rates required to achieve the 110 litre target, in comparison to those required for the 125 litre target.

Fitting	Typical new build specification	Proposed specification
WC	6 / 4 litre dual flush	4 / 2.6 litre dual flush
Bath	200 litre capacity	180 litre capacity
Shower	9 litres/min	8 litres/min
Wash hand basin taps	7 litres / min	6 litres / min
Kitchen taps	7 litres / min	6 litres / min

Washing machine	8.17 litres / kg dry load*	8.17 litres / kg dry load*
Dishwasher	1.25 litres / place setting *	1.25 litres / place setting *
Total water consumption (l/person/day)	123.00	108.75

* where washing machines and dishwashers are not provided the calculation still allows for their consumption based on typical performance

Figure 10 Sanitary ware specification

Installation	Unit of measure	(1)	(2)	(3)	(4)
		Capacity / flow rate	Use factor	Fixed use (litres / person / day)	Litres / person / day
					= [(1)x(2)]+(3)
WC (single flush)	Flush volume (litres)	0	4.42	0	0.00
WC (dual flush)	Full flush volume (litres)	4	1.46	0	5.84
	Part flush volume (litres)	2.6	2.96	0	7.70
Wash hand basin taps	Flow rate (litres / min)	6	1.58	1.58	11.06
Bath (shower also present)	Capacity to overflow (litres)	180	0.11	0	19.80
Shower (bath also present)	Flow rate (litres / min)	8	4.37	0	34.96
Bath only	Capacity to overflow (litres)	0	0.5	0	0.00
Shower only	Flow rate (litres / min)	0	5.6	0	0.00
Kitchen / utility taps	Flow rate (litres / min)	6	0.44	10.36	13.00
Washing machine	Litres / dry load	8.17	2.1	0	17.16
Dishwasher	Litres / place setting	1.25	3.6	0	4.50
Waste disposal	Litres / use	0	3.08	0	0.00
Water softener	Litres / person / day	0	1	0	0.00
		(5)	Total calculated use		114.01
		(6)	Contribution from greywater (litres / person / day)		0.00
		(7)	Contribution from rainwater (litres / person / day)		0.00
		(8)	Normalisation factor		0.91
		(9)	Total water consumption =[(5)-(6)-(7)]x(8) (litres / person / day)		103.75
		(10)	External water use (litres / person / day)		5.00
		(11)	Total calculated use = (9)+(10) (litres / person / day)		108.75

Figure 11 Water efficiency calculator

This water efficiency calculation confirms that, based on the specification listed, all dwellings within the Proposed Development will have water consumption of less than 110 litres per person per day therefore meeting the requirements of planning policy.

4.2 Electric vehicle charging

With a growing demand for lower emission forms of transport, there has been an increase in recent years in the market for electric vehicles. This growth is set to continue rapidly over the coming years, as the Government seek to phase out the sale of new petrol and diesel cars from 2030. It is therefore important that suitable provision is made for charging of electric vehicles. Dedicated home charging points deliver faster charging times in a safe and reliable manner. With the development making use of low carbon electric forms of heating, it is key that local demand on the grid, for both heating and transport needs, is factored into the supply to the site.

The proposed development will make the following provision for electric vehicle charging points in line with the requirements of the Building Regulations Approved Document Part S 2021:

- All new homes with an associated parking space (as defined in Part S) will be provided with an electric vehicle charging point. In addition, 50% of visitor spaces will also have EV charging.

4.3 Materials & waste

Optimising the use of materials in the construction of the proposed development offers the potential to not only decrease the embodied energy / carbon impact but also to minimise the generation of waste. Each stage of the design and construction process offers opportunities to evaluate the use of resources.

Design stage

Before considering the procurement of materials and specific supplier, opportunities will be taken to reduce the quantities of materials needed, specify durable materials, and select material types with low embodied environmental impact. The design team will:

- Identify a 'designing out waste' champion, to take responsibility for the material efficiency strategy.
- Determine whether existing site resources can be reused / recycled for use on site. As a greenfield site the development does not involve demolition of existing buildings, however there may be opportunities, for example, for the use of excavated soil / rock to be re-used on site for backfill or landscaping. This would reduce waste generated and removed from site.
- Review building designs to ensure dimensions are standardised and aligned to standard product dimensions (for example ceiling heights to plasterboard sizes).
- Review material choices considering their life cycle impact in terms of carbon emissions.
- Review the M&E specification as it is developed to ensure all elements and their controls are compatible with each other, also considering the lifespan of the various technologies.
- Appraise materials for their durability with consideration of the building type and its users.

- Identify opportunities to make buildings more adaptable to other uses during their lifespan.
- Prepare a Site Waste Management Plan identifying all potential waste materials and their estimated quantities, methods for sorting and storing on site, recycling or recovery route.
- Ensure components which require replacement to be easily accessible without disrupting / damaging other materials around them, and without damaging air tightness membranes.
- Consider the use of prefabricated elements which generally significantly reduce the amount of waste produced on site, use less raw materials and are typically quicker to install. This will be considered alongside the ability for these to be maintained / repaired without the whole element needing to be replaced.
- Design considering climate change adaptation, and the need for the buildings to be more resilient to changing temperatures and climate patterns.
- Refer to recognised industry standards in specifying material build ups such as the BRE Green Guide to Specification.

Procurement

Following the process of designing out waste, and specifying low impact, durable and resilient materials, the procurement phase will:

- Review individual work packages to identify further opportunities for material efficiency.
- Set waste reduction targets in tender / contract documents with suppliers and sub contractors, along with a requirement to report regularly on progress.
- Request material deliveries in recyclable / compostable / reusable packaging.
- Promote the use of local suppliers and manufacturers of construction materials, retaining investment in the local economy and reducing transport related emissions.
- Specify timber with recognised responsible sourcing certification such as FSC or PEFC. Given that the proposed construction is anticipated to be timber frame, ensuring sustainably sourced timber will be a high priority.
- Procure other materials from suppliers that hold nationally recognised sustainability certification such as ISO14001 or BES6001.
- Ensure paints, varnishes and floor coverings are specified with low VOC content in order to improve indoor air quality for occupants.

Construction phase

During the construction phase actions will be taken to:

- Implement the Site Waste Management Plan (SWMP) compiled during the design phase.
- Ensure careful storage of materials on site to avoid damage and wastage.
- Protect vulnerable items from damage, contamination, and degradation from moisture and weather.
- Work with contractors and subcontractors to forecast site waste arisings and waste management plans.
- Optimise delivery of the programme so that works take place in the correct sequence, minimising wasted materials and the need to rectify defects.
- Establish an effective materials delivery regime so that correct quantities of materials are available at the right time.
- Monitor energy and water use from construction site activities.
- Provide site accommodation and welfare facilities with a lower impact through features such as low flush volume WCs, flow restrictors to wash hand basin taps and LED Lighting with controls.
- Consider use of alternative fuels for construction site use such as biodiesel to reduce carbon emissions.

4.4 Climate resilience

The development has been designed to be resilient to the impacts of climate change through the integration of sustainable drainage systems (SuDS) and climate-adapted landscaping. Surface water will be managed via SuDS in the form of permeable paving, balancing ponds and rain gardens, which will be implemented across the development. These systems are designed to promote infiltration of surface water into the ground, thereby reducing discharge to the public sewer network and helping to manage local flood risk. Systems will be sized based on the impermeable areas within the development, including roofs, paved surfaces, and other hardstanding areas, and will incorporate additional storage capacity to account for predicted increases in rainfall intensity and frequency due to climate change.

In addition, landscaped areas will incorporate drought-resistant planting, minimising irrigation requirements and ensuring long-term viability under warmer and drier conditions. Collectively, these measures provide a holistic approach to water management, enhance ecological value, and ensure the development remains adaptable and sustainable under changing climatic conditions.

Resolution Energy is a member of



Resolution/rɛzəluːʃ(ə)n/

1. a firm decision to do something 2. the quality of being determined 3. the act of solving a problem 4. the process of separating something into constituent parts

Contact

Claire Westron, Director
07806 286 338
claire@resolutionenergy.co.uk
www.resolutionenergy.co.uk

Registered in England and Wales 13111905