



Sustainability Statement

Leonora Apartments

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Revision History

Version	Date Issued	Issued by	QA Check
1	27/01/2026	Robert Holbrook, BSc MSc	Alex Dodson, BSc

About Environmental Economics

Our team of experienced consultants specialise in construction and building energy. We have qualifications in sustainability, energy, engineering, building physics and construction as well as environmental, quality management and auditing.

We develop flexible, practical, cost-effective specifications for our clients through identifying solutions and delivering design advice. This includes the following disciplines:

- *Energy Reports*
- *Sustainability Statements*
- *Compliance assessments and advice covering*
 - *Part L (SAP) & Future Homes Standard*
 - *Part F (ventilation)*
 - *Part G (water)*
 - *Part O (overheating)*
- *Overheating - TM59 dynamic modelling*
- *Overheating – simple method*
- *Life cycle carbon assessments*
- *Net zero carbon assessments*
- *BREEAM*
- *SBEM (existing and new build)*
- *Minimum Energy Efficiency Standards (MEES)*
- *Thermal Bridging (Psi value calculations)*

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1. Executive Summary

- 1.1.1. Environmental Economics Ltd has been commissioned by Horizon Homes Ltd to produce an energy and sustainability report for the residential site Leonora Apartments. This document sets out how the development proposal presents a positive sustainable development and meets the policy requirements.
- 1.1.2. As part of the sustainable development strategy, the proposed development has been designed to consider sustainability in accordance with the National Planning Policy Framework (NPPF) and the Wiltshire Core Strategy 2015.
- 1.1.3. Water efficiency has been reviewed as part of the design process and a Part G compliant specification will be adopted, resulting in the higher standard (lower water use) of 110 litres/person/day.
- 1.1.4. The use of smart meters will provide occupiers with real time data which will allow occupiers to manage their energy consumption, save money and reduce Carbon. This is particularly important as the UK migrates towards half-hourly pricing levels and the proposed smart grid system.
- 1.1.5. Electric vehicle charging points will be provided for all plots in line with Part S of the 2021 Building Regulations.
- 1.1.6. Potential overheating risk will be assessed in accordance with Approved Document O.
- 1.1.7. While the development is still at an early stage of the design process, it is considered that the proposal meets or exceeds the required level of sustainability across all given criteria.
- 1.1.8. It is anticipated that all 31 plots will be constructed to comply with the uplifted standards of Part L 2021.
- 1.1.9. Dwellings achieving Part L 2021 standards incorporate good standards of building fabric insulation and airtightness, very efficient building services, and a range of low or zero carbon technologies (LZCT).
- 1.1.10. The following LZCT are proposed for all plots on site:
 - Air Source Heat Pump cylinders (ASHPs)
 - Photovoltaic (PV) Panels

2. Project Overview

2.1. Description of Site

- 2.1.1. The site proposal consists of the construction of 31 residential dwellings which include 1, 2 and 3 bedroom dwellings in the form of apartments.
- 2.1.2. The proposed site plan is shown in Appendix A.

2.2. Planning Policy

- 2.2.1. The planning authority for this site is the Wiltshire Council. The local plan containing the relevant planning policy is the Wiltshire Core Strategy 2015.
- 2.2.2. There are several relevant policies within the local plan as follows:

- 2.2.3. Core Policy 41 Sustainable construction and low-carbon energy

Climate change adaptation

New development, building conversions, refurbishments and extensions will be encouraged to incorporate design measures to reduce energy demand. Development will be well insulated and designed to take advantage of natural light and heat from the sun and use natural air movement for ventilation, whilst maximising cooling in the summer.

Sustainable construction

New homes (excluding extensions and conversions) will be required to achieve at least Level 4 (in full) of the Code for Sustainable Homes.

Conversions of property to residential use will not be permitted unless BREEAM's Homes "Very Good" standards are achieved.

All non-residential development will be required to achieve the relevant BREEAM "Very Good" standards, rising to the relevant BREEAM "Excellent" standards from 2019.

Existing buildings

Retrofitting measures to improve the energy performance of existing buildings will be encouraged in accordance with the following hierarchy:

- i. Reduce energy consumption through energy efficiency measures*
- ii. Use renewable or low-carbon energy from a local/district source*
- iii. Use building-integrated renewable or low-carbon technologies.*

Opportunities should be sought to facilitate carbon reduction through retrofitting at whole street or neighbourhood scales to reduce individual costs, improve viability and support coordinated programmes for improvement.

Renewable and low-carbon energy

All proposals for major development will be required to submit a Sustainable Energy Strategy alongside the planning application outlining the low-carbon strategy for the proposal.

In all cases, including those listed above, proposals relating to historic buildings, listed buildings and buildings within conservation areas and world heritage sites should ensure that appropriate sensitive approaches and materials are used. Safeguarding of the significance of heritage assets should be in accordance with appropriate national policy and established best practice.

In all cases the impact of these requirements on the viability of development will be taken into consideration.

2.2.4. Core Policy 57 Ensuring high quality design and place shaping

A high standard of design is required in all new developments, including extensions, alterations, and changes of use of existing buildings. Development is expected to create a strong sense of place through drawing on the local context and being complementary to the locality. Applications for new development must be accompanied by appropriate information to demonstrate how the proposal will make a positive contribution to the character of Wiltshire through:

- i. enhancing local distinctiveness by responding to the value of the natural and historic environment, relating positively to its landscape setting and the existing pattern of development and responding to local topography by ensuring that important views into, within and out of the site are to be retained and enhanced*
- ii. the retention and enhancement of existing important landscaping and natural features, (e.g. trees, hedges, banks and watercourses), in order to take opportunities to enhance biodiversity, create wildlife and recreational corridors, effectively integrate the development into its setting and to justify and mitigate against any losses that may occur through the development*
- iii. responding positively to the existing townscape and landscape features in terms of building layouts, built form, height, mass, scale, building line, plot size, elevational design, materials, streetscape and rooflines to effectively integrate the building into its setting*
- iv. being sympathetic to and conserving historic buildings and historic landscapes*
- v. the maximisation of opportunities for sustainable construction techniques, use of renewable energy sources and ensuring buildings and spaces are orientated to gain maximum benefit from sunlight and passive solar energy, in accordance with Core Policy 41 (Sustainable Construction and Low Carbon Energy)*
- vi. making efficient use of land whilst taking account of the characteristics of the site and the local context to deliver an appropriate development which relates effectively to the immediate setting and to the wider character of the area*
- vii. having regard to the compatibility of adjoining buildings and uses, the impact on the amenities of existing occupants, and ensuring that appropriate levels of amenity are achievable within the development itself, including the consideration of privacy, overshadowing, vibration, and pollution (e.g. light intrusion, noise, smoke, fumes, effluent, waste or litter)*
- viii. incorporating measures to reduce any actual or perceived opportunities for crime or antisocial behaviour on the site and in the surrounding area through the creation of visually attractive frontages that have windows and doors located to assist in the informal surveillance of public and shared areas by occupants of the site*
- ix. ensuring that the public realm, including new roads and other rights of way, are designed to create places of character which are legible, safe and accessible in accordance with Core Policy 66 (Strategic Transport Network)*
- x. the sensitive design of advertisements and signage, which are appropriate and sympathetic to their local setting by means of scale, design, lighting and materials*
- xi. taking account of the needs of potential occupants, through planning for diversity and adaptability, and considering how buildings and space will be used in the immediate and long term future*
- xii. the use of high standards of building materials, finishes and landscaping, including the provision of street furniture and the integration of art and design in the public realm*
- xiii. the case of major developments, ensuring they are accompanied by a detailed design statement and masterplan, which is based on an analysis of the local context and assessment of constraints and opportunities of the site and is informed by a development concept, including clearly stated design principles, which will underpin the character of the new place*
- xiv. meeting the requirements of Core Policy 61 (Transport and New Development)*

2.2.5. Core Policy 67 Flood Risk

Development proposed in Flood Zones 2 and 3 as identified within the Strategic Flood Risk Assessment will need to refer to the Strategic Housing Land Availability Assessment when providing evidence to the local planning authority in order to apply the sequential test in line with the requirements of national policy and established best practice.

All new development will include measures to reduce the rate of rainwater run-off and improve rainwater infiltration to soil and ground (sustainable urban drainage) unless site or environmental conditions make these measures unsuitable.

2.2.6. Core Policy 68 Water resources

Development must not prejudice the delivery of the actions and targets of the relevant River Basin or Catchment Management Plan, and should contribute towards their delivery where possible.

Non-residential development will be required to incorporate water efficiency measures. Developers will be expected to submit details of how water efficiency has been taken into account during the design of proposals.

Development proposals within a Source Protection Zone, Safeguard Zone or Water Protection Zone must assess any risk to groundwater resources and groundwater quality and demonstrate that these would be protected throughout the construction and operational phases of development.

2.2.7. This report seeks to address the planning policies relevant for the proposed site and present a sustainable strategy.

2.2.8. The Code for Sustainable Homes is now an obsolete assessment tool, however compliance with Part L 2021 automatically achieved the achievements laid out in Level 4 of the Code for Sustainable Homes, therefore meaning that this development complies with requirements laid out in Core Policy 41 of the Wiltshire Core Strategy 2015.

2.2.9. This report should be read in conjunction with other reports prepared for this development.

2.3. Building Regulations

- 2.3.1. All newbuild development must comply with Building Regulations. Approved Document L1A 2021 (AD-L 2021) provides for a 31% reduction in Carbon emissions over the previous AD-L 2013 standard requirements.
- 2.3.2. Part L 2021 regulations have a higher standard in carbon requirements. Specifically, any plots which are built to Part L 2021 (using SAP 10 methodology) will exceed Part L 2013 regulations by 31%. It is currently understood that all proposed dwellings at Leonora Apartments are being built to Part L 2021.
- 2.3.3. Some/all plots on the proposed development may fall under the upcoming Future Homes Standard, which was expected to be published in 2025, now expected early 2026, and represents an improvement on current (Part L 2021) building regulations by approximately 49%.
- 2.3.4. The former government minister Christopher Pincher is quoted as saying, "A new home built to Future Homes Standard in 2025 is to have 75-80% lower carbon emissions than Part L 2013."¹
- 2.3.5. Based on the above statement and the 31% betterment from Part L1A 2013 to Part L1A 2021 regulations, it can be reasoned that the likely betterment over current regulations (Part L 2021) will be 49% as shown below:

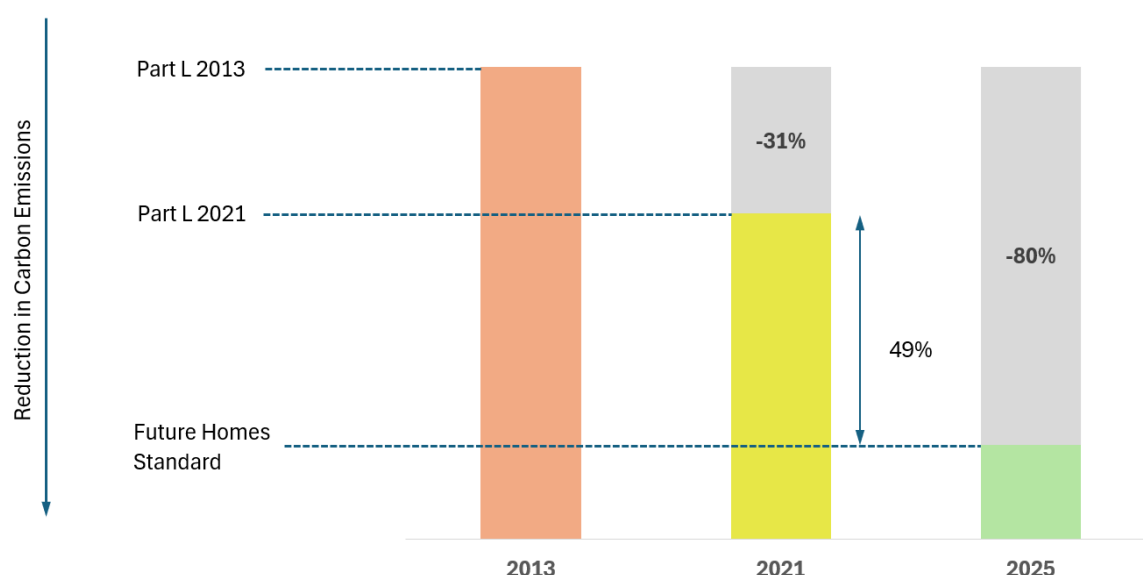


Figure 1: Regulatory targets for Carbon emissions. Percentage figures are reductions over Part L 2013 baseline.

¹ Christopher Pincher, "Housing Minister's Speech at HOMES UK Conference," GOV.UK, accessed November 6, 2024, <https://www.gov.uk/government/speeches/housing-ministers-speech-at-homes-uk-conference>.

3. Sustainability Appraisal

3.1. Green Guide Materials

- 3.1.1. The Green Guide is used to examine the environmental impact of the construction materials commonly used within dwellings.
- 3.1.2. The proposed development should be constructed using materials consisting of predominantly 'A' and 'A+' Green Guide rated elements. 'A+' rated construction elements include: pitched roof construction, internal upper floors, internal timber partitions and external cavity walls.

3.2. Responsible Sourcing

- 3.2.1. Materials used within construction of the proposed development are to be at a certified standard, proving the materials sourced have been done so with sustainability in mind.
- 3.2.2. Responsible sourcing of materials can come in a variety of certifications including: BES 6001, FSC, PEFC and EMS.
- 3.2.3. Additionally, the site aims to utilise timber that is procured sustainably and independently accredited by either the FSC or PEFC schemes.

3.3. Waste Management

- 3.3.1. The proposed development aims to use waste reduction procedures to enable waste reduction and diversion of waste from landfill. The goal is to minimise waste and maximise re-use of resources in response to climate change.
- 3.3.2. It is recommended that a waste management plan be utilised to divert maximum waste from landfill.
- 3.3.3. Adequate space for storage and sorting of household waste and recycling will be provided to individual dwellings and through the dedicated bin storage at ground floor level.
- 3.3.4. Refuse and recycling collection will be in line with the surrounding area.

3.4. Flood Risk

- 3.4.1. Appendix B shows the Environment Agency Flood Risk Map for the site location.
- 3.4.2. All residential development on site will be within Flood Zone 1, the lowest probability evaluated by the Environment Agency. Flood Zone 1 is defined as land with less than 1 in 1000 annual probability of river or sea flooding.
- 3.4.3. Zone 1 flood risk is considered best practice for a positive sustainable development and would be well located for a site that is resilient to climate change.
- 3.4.4. The development therefore complies with flood risk requirements laid out in Core Policy 67 of the Wiltshire Core Strategy 2015.

3.5. Sustainable Urban Drainage

- 3.5.1. A Drainage and Flood Risk Assessment has been carried out for this development.
- 3.5.2. This study included a SuDS Assessment. The assessments carried out consider any potential drainage and flood risk issues which could arise from the development and put forward recommendations to mitigate these impacts.
- 3.5.3. Full details of the recommendations put forward can be found in the associated report.
- 3.5.4. The development will therefore comply with Core Policy 67 of the Wiltshire Core Strategy 2015.

3.6. Ecology

- 3.6.1. A full Ecology Statement has been carried out for the site.
- 3.6.2. The Ecology Statement takes into account any habitats and species which could be impacted by the proposed development and puts forth recommendations on how to minimise any potential impacts and protect or improve any habitats.
- 3.6.3. Full details of the recommended approach to ecology can be found in the associated report.

3.7. Electric Vehicle Charging and Sustainable Transport

- 3.7.1. Providing EV charging points or the ability to retrofit EV charging points is an exemplary measure for sustainability and promotes sustainable lifestyles for residents.
- 3.7.2. With the provision of EV charging points, residents would have ready opportunity to purchase / lease EV's and have immediate secure charging infrastructure. This aligns with current government policy to stop the sale of new petrol and diesel cars by 2030 (GOV.UK, April 2025).
- 3.7.3. The BEAMA Guide to Electric Vehicle Infrastructure (BEAMA, 2015) illustrates the various "Modes" of electric car charging, with Mode 1 being the slowest, and Mode 4 the fastest. Mode 1 is not recommended and Mode 4 is only recommended for public and commercial use. Modes 2 to 3 are suitable for dedicated charging of EV's at domestic properties. Please refer to Figure 2 below which shows common infrastructure side connections for Mode 2 and 3.

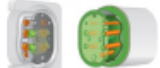
CONNECTOR TYPE	BS 1363	BS EN 60309-2	BS EN 62196-2 TYPE 2	BS EN 62196-2 TYPE 3
				
MODE	2	2	3	3
MAX POWER (kW) (at mains voltage i.e. harmonised EU voltages)	Single phase - 3	Single phase - 28.8 Three phase - 86.6	Single phase - 16.1 Three phase - 43.7	Single phase - 7.4 Three phase - 43.7
NOTES	Standard UK household plug & socket-outlet system	Standard industrial plug & socket-outlet system	Specialist EV	Specialist EV

Figure 2 – Common infrastructure options for Mode 2 and 3 EV charging points (BEAMA, 2015)

- 3.7.4. It is currently proposed that there will be provision of compliant EV charging points in accordance with Approved Document S of the 2021 Building Regulations.
- 3.7.5. Active EV charging points will be provided to all dedicated parking spaces, with cabling provided for future adaptation of visitor parking bays.
- 3.7.6. The full specification of these charging points will be determined during detailed design stage.
- 3.7.7. The development has also been designed with sustainable transport in mind, being within walking distance of connections to the public transport network and the provision of secure and sheltered cycle storage spaces on the ground floor.

3.8. Water Use

3.8.1. The design team will implement a specification which complies with the optional requirement of 110 litres/person/day as set out in Approved Document G 2015 with 2016 amendments (AD-G).

3.8.2. While the build specifications are not yet set, the table below provides an example of a compliant strategy, delivering reduced water consumption of 110litres/person/day.

		(1)	(2)	(3)	(4)
Installation type	Unit of measure	Capacity / flow rate	Use factor	Fixed use (litres/person/day)	Litres/person/day = [(1) × (2)] + (3)
WC (dual flush)	Full flush volume (litres)	4	1.46	0.00	5.84
WC (dual flush)	Part flush volume (litres)	2.6	2.96	0.00	7.696
Taps (excluding kitchen/utility room taps)	Flow rate (litres/minute)	5	1.58	1.58	9.48
Bath (where shower also present)	Capacity to overflow (litres)	170	0.11	0.00	18.7
Shower (where bath also present)	Flow rate (litres/minute)	9	4.37	0.00	39.33
Kitchen/utility room sink taps	Flow rate (litres/minute)	5	0.44	10.36	12.56
Washing machine	Litres/kg dry load	8.17	2.1	0.00	17.157
Dishwasher	Litres/place setting	1.25	3.6	0.00	4.5
	(5)	Total calculated use = (Sum column 4)			115.3
	(6)	Contribution from greywater (litres/person/day) from Table 4.6			0
	(7)	Contribution from rainwater (litres/person/day) from Table 5.5			0
	(8)	Normalisation factor			0.91
	(9)	Total water consumption = [(5) – (6) – (7)] x (8)			104.9
	(10)	External water use			5.0
Approved Document G	(11)	Total water consumption = (9) + (10) (litres/person/day)			109.9

3.8.3. Alternative component consumption rates are available which can achieve the required water consumption. The rates provided are representative only.

3.8.4. The calculated results show that utilisation of the representative component's water consumption can achieve a maximum of 105 litres per person per day internally, and additional external water use of 5 litres per person per day.

3.8.5. The development therefore complies with Core Policies 41 and 68 of the Wiltshire Core Strategy 2015.

3.9. Overheating Risk

- 3.9.1. Extreme temperatures have an adverse effect on health and wellbeing. 'Overheating' occurs when the building temperature exceeds the limits of thermal comfort. Since UK weather data records began in 1884, the ten warmest years have all occurred since 2003, including 2020, 2022 and 2023. Future temperatures should be considered across a building's lifetime to ensure further thermal comfort. Furthermore, advances in air tightness and thermal insulation levels have exacerbated overheating risk.
- 3.9.2. The Building Regulations (Amendment) (England), 2021, requires all residential buildings limit overheating risk by limiting unwanted solar gains in summer and by providing an adequate means of removing excess heat from the indoor environment. This can be assessed either by using the simplified method, which is set out in Section 1 of Approved Document O (ADO), or by using the dynamic thermal modelling method, as set out in Section 2 of ADO, which is based on CIBSE TM59.
- 3.9.3. There are many factors to consider when assessing overheating risk, such as the building orientation, cross ventilation, glazing area, window openable area, total solar transmittance of glazing, building fabric efficiency, solar shading and ventilation provision.
- 3.9.4. Solutions to mitigate overheating risk include improving shading, which limits solar gains, and increasing ventilation, which can help purge habitable rooms of hot air. Shading solutions include low g-factor glazing, brise soleil, shutters and overhangs. Ventilation solutions include low-noise extract fans, mechanical ventilation (if heat recovery is specified, it must include a summer bypass), and ceiling fans. All ventilation systems must meet the noise requirements set out in Approved Document F.
- 3.9.5. The safety and reasonable enjoyment of the residence of all occupants must be considered when designing overheating solutions. If all strategies to passively cool the building are insufficient, then mechanical cooling may be used.

4. Energy Performance

4.1. Assessment Methodology

4.1.1. Upon detailed design stage, the proposed dwellings will be assessed against building regulations using approved SAP software. The software provides a number of outputs, and based on the provided specification for this proposed development, we are able to assess the following areas for our calculations:

- *Building regulations compliance, including:*
 - *Carbon emissions (kg CO₂/m²/year)*
 - *Primary Energy Demand (kWh/m²/annum)*
 - *Fabric Energy Efficiency (kWh/m²/annum)*
- *Energy usage per year (kWh/annum)*
- *Energy costs per year (£/annum)*
- *More detailed breakdowns by end use (space heating, water heating, cooking, lighting, appliances)*

4.1.2. Each of these outputs can be used in different ways to analyse the performance of the dwelling. The total regulated carbon emissions for each property is based upon:

- *Space heating*
- *Water heating*
- *Electricity for pumps and fans*
- *Electricity for lighting*

4.1.3. Part L 2021 requires all newbuild properties to be designed to operate space heating at lower temperatures to ensure suitability for heat pumps (AD-L, section 5.10). It is therefore a natural decision to adopt heat pumps on this development.

4.1.4. SAP software is issued by independent software suppliers, and checked and approved on behalf of government by the Building Research Establishment (BRE).

4.1.5. The specifications enclosed are provided in order to illustrate good design intent and indicate resultant performance. Data should therefore be taken as draft and has scope to be updated prior to construction stage.

4.2. Design Philosophy

- 4.2.1. Upgrades have been made to a number of elements from a standard build specification in order to improve energy efficiency across the development.
- 4.2.2. The proposed development adopts nationally recognised design and construction principles as the industry moves towards zero carbon. The principles are illustrated in Figure 3 below.

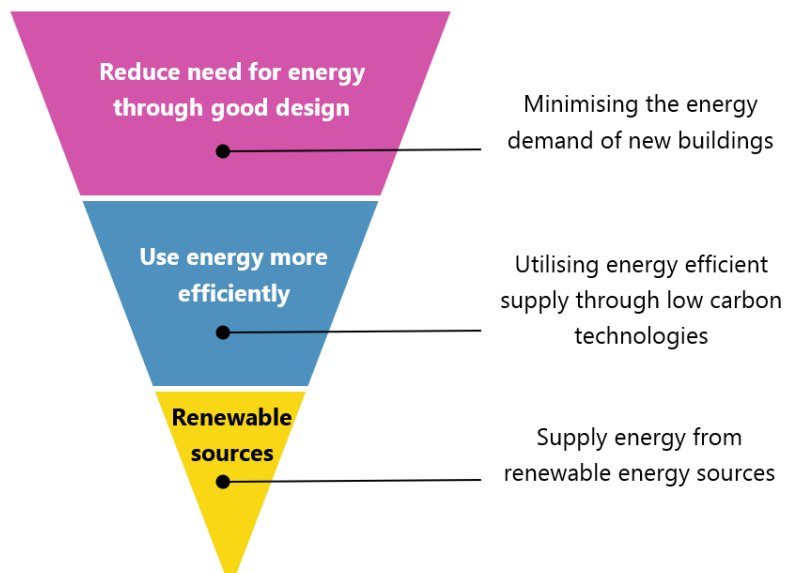


Figure 3 – The Energy Hierarchy

- 4.2.3. To reduce the residual carbon emissions a number of improvements were made to the standard material and product specification. These improvements include:
- *Upgraded heating and hot water controls*
 - *Improved insulation levels*
 - *Design air permeability of 4m3/hr/m2*
 - *Bespoke low heat loss thermal bridging details*

4.3. Fabric Improvements Part L1A 2021

- 4.3.1. The building fabric for all plots within the proposed development will be improved in relation to the ADL 2021 backstop notional specification. These fabric improvements reduce the space heating requirement upon a property. The improvements will be made through a combination of upgraded materials and increased insulation thicknesses. Enhanced glazing with a larger transmittance factor allowing for increased solar gains will also be used.
- 4.3.2. The current plans for this site do not propose specific materials to be used for building the new properties. Therefore, U-values used for the sample assessments are based on the notional specification in ADL 2021. When the materials have been confirmed for the building, they must be less than or equal to the notional U-Values listed in Table 1.

Table 1 – Part L 2021 Build Specification

<i>Element</i>	<i>Part L 2021 Backstop</i>	<i>Notional U-Value Performance</i>
-	<i>W/m²k</i>	<i>W/m²k</i>
Walls	0.26	0.18
Roof	0.16	0.11
Doors	1.60	1.20
Floors	0.18	0.13
Glazing	1.60	1.20

- 4.3.3. Please note that this specification is not finalised and is subject to change up until construction stage.
- 4.3.4. As improvements are made to the thermal conductivity of main elements, thermal bridging and air permeability becomes increasingly significant in the overall fabric performance.
- 4.3.5. The design is at an early stage, and so it is not feasible to accurately model psi values (thermal losses at junctions of building elements). During detailed design process the actual psi values must be modelled and should achieve or improve upon the Notional values.
- 4.3.6. A target air pressure rating of 4.00m³/hr/m² has been set for all domestic units, which is an improvement on the maximum allowable rating in the 2021 Building Regulations.

4.4. Building Services & Renewable Energy (LZCT)

- 4.4.1. The systems used in a property to supply hot water and heating, as well as to control it, are important to the overall energy demand of a property.
- 4.4.2. The design of building services which provide space heating and domestic hot water, ventilation, and lighting, must be considered in a holistic way in order to avoid unintended consequences and to maximise the benefits from such systems.
- 4.4.3. After due consideration of the potential LZCT available (shown in Appendix C) the design team propose to adopt the following technologies which provide benefits / compliance with national and local policies as listed:
- ***Air source heat pump (ASHP) cylinders:***
 - No connection to the gas grid.
 - Uses grid electricity as the fuel.
 - Provides 100% domestic hot water.
 - Minimum co-efficient of performance over 2.5 (250% efficient)
 - ASHP cylinders are defined as LZCT. For every 1 kWh of grid electricity consumed they deliver approx. 3kWh into the dwelling (300% efficient). 2kWh is taken from ambient air.
 - Delivers very good performance within Building Regulations assessments.
 - Significant reduction in primary energy demand due to the Coefficient of Performance (COP).
 - ***Photovoltaic (PV) panels:***
 - Low noise and visual pollution
 - Efficient low carbon source of renewable energy
 - ***Decentralised Mechanical Extract Ventilation (dMEV)***
 - *Quieter than standard extractor fans.*
 - *Technology that manages humidity that is significantly more energy efficient in comparison to standard extractor fans.*
- 4.4.4. It is currently proposed to provide hot water via ASHP cylinders for all dwellings. A product information sheet detailing an ASHP cylinder can be found in Appendix D. An alternative manufacturer or product can be utilised subject to similar specification and performance being obtained.
- 4.4.5. Space heating is to be provided from electric panel heaters / high heat retention (HHR) storage heaters. These use grid electricity as the fuel and are 100% efficient.
- 4.4.6. dMEV is currently proposed to be used as the ventilation strategy for all dwellings. A product information sheet detailing a dMEV model can be found in Appendix E. An alternative manufacturer or product can be utilised subject to similar specification and performance being obtained.

- 4.4.7. A full breakdown of the LZC technologies considered for the proposed development is shown in Appendix C.
- 4.4.8. Where installed, hot water cylinders can lose a significant amount of energy. To minimise this energy loss and corresponding carbon emissions, cylinders which have higher levels of insulation in comparison to typical hot water cylinders will be used.
- 4.4.9. Hot water distribution pipework will be fully insulated.
- 4.4.10. Lighting provision will be from LED low energy fittings achieving a minimum efficacy of 100 lamp lumens per circuit watt, an improvement of over 50% from AD-L 2013 performance levels.
- 4.4.11. Smart meters will be installed on all properties, providing:
- Real time information on energy use both in terms of consumption and cost
 - Occupier can manage their energy, save money and reduce carbon emissions
 - Smart meters will also allow for easier switching between suppliers
 - Facilitate a more reactive, price driven, demand-response
 - End estimated billing and eliminate the need for meter readers to visit premises

5. Conclusion

5.1.1. This energy and sustainability report has been produced for the residential site Leonora Apartments.

5.1.2. Each unit employs the use of Low and Zero Carbon Technologies (LZCT), including:

- Air Source Heat Pump (ASHP) cylinders
- Photovoltaic (PV) Panels

5.1.3. The development strategy sets a high standard of overall sustainability with measures that include:

- Building elements with highest standard 'A+' Green Guide ratings including upper floors, external cavity walls, internal partitions, insulation and pitched roof;
- Material suppliers with responsible sourcing certification guided by a high-quality sustainable procurement policy;
- Effective waste management procedures to minimise waste;
- The implementation of drainage and ecology assessments;
- The provision of EV charging points in line with Approved Document S;
- Efficient internal and external water use in line with building regulations;
- Enhanced building fabric specification with a Fabric-First approach including high efficiency insulation and provision of efficient appliances;
- Use of ASHP cylinders and PV to achieve the efficiency levels required under Part L 2021.

5.1.4. It should be noted that future policies and building regulations may require an update to the sustainability measures within this report.

5.1.5. The proposed site is found to present a positive sustainable development based on the assessed sustainability criteria.

Appendix A – Proposed Site Layout



Appendix B – Flood Risk Map (Zone 1)



Flood map for planning

Your reference	Location (easting/northing)	Created
Leonora Apartments	392564/172645	27 January 2026 10:36

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

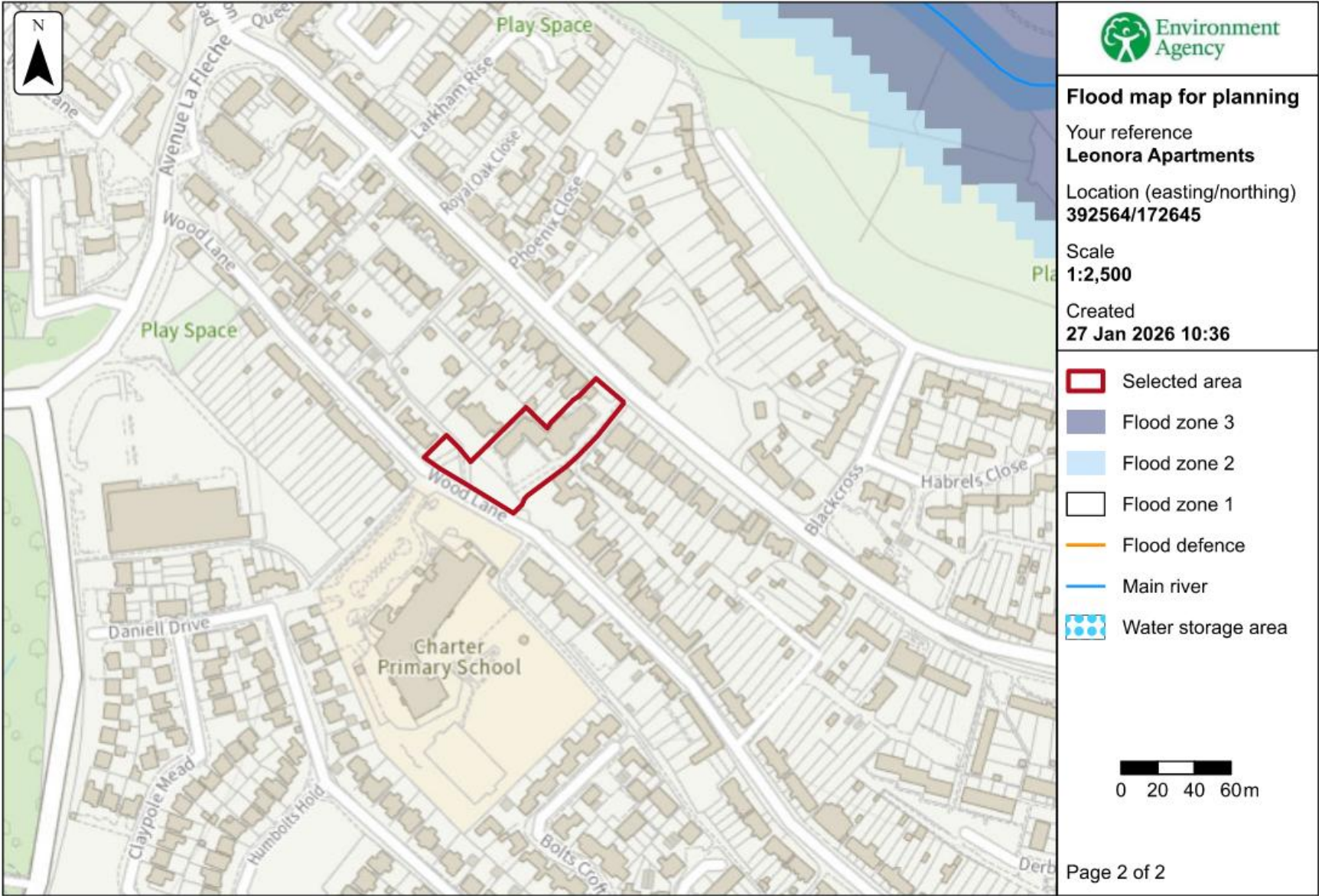
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



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Appendix C – Low and Zero Carbon Technologies

Description		Advantages	Disadvantages	Adopted?
Solar Hot Water (SHW)	SHW systems generate energy which is used to heat stored water (in a special solar hot water cylinder) which offsets the energy required for the boiler, thereby reducing fuel use and reducing carbon emissions.	Meets approximately 50% hot water demand for a dwelling	PV cells provide more efficient use of roof area compared to SHW	
Air Source Heat Pump (ASHP) cylinders	ASHP cylinders provide hot water to a home through thermal energy gathered from air outside the dwelling.	- It is possible for an ASHP cylinder unit to provide 100% of the hot water demand. - Typical CoP of 3.5 leading to large energy and carbon savings.	Currently expensive to run compared with gas	✓
Ground Source Heat Pumps (GSHP)	GSHP provide heating and hot water to a dwelling through geothermal effects.	CoP can be greater than that of ASHPs	- Rely on having appropriate ground conditions - Expensive to install	
Biomass Heating Systems	Biomass heating systems burn fuels, considered carbon neutral, to heat the water required for a dwelling.	- Large variety of systems available - Good carbon savings when replacing electrical hot water system	High maintenance	
Wind Turbines	Wind turbines provide electricity directly to a dwelling. They can be added to a property in two ways: pole mounted or building mounted.	Large-scale pole mounted turbines provide great financial return	- Pole mounted require a lot of space - Building mounted have lower power output	
Photovoltaic (PV) Cells	Generates electricity from solar energy from the sun.	- Provides carbon savings - Excess electricity can be exported to the grid - Low maintenance	Additional capital cost	✓

Subject to final SAP calculations, the following technologies could be considered for the scheme:

Description		Advantages	Disadvantages	Adopted?
Waste Water Heat Recovery (WWHR)	Recovers the energy that is lost from the waste water that is generated from showers.	• Reduces load on the main DHW system, leading to greater energy/carbon savings • Passive design requiring very low maintenance	• Additional capital cost	

Appendix D – Proposed ASHP Cylinder Product Information

Nuos Plus Wi-Fi



200L Direct/250L Indirect

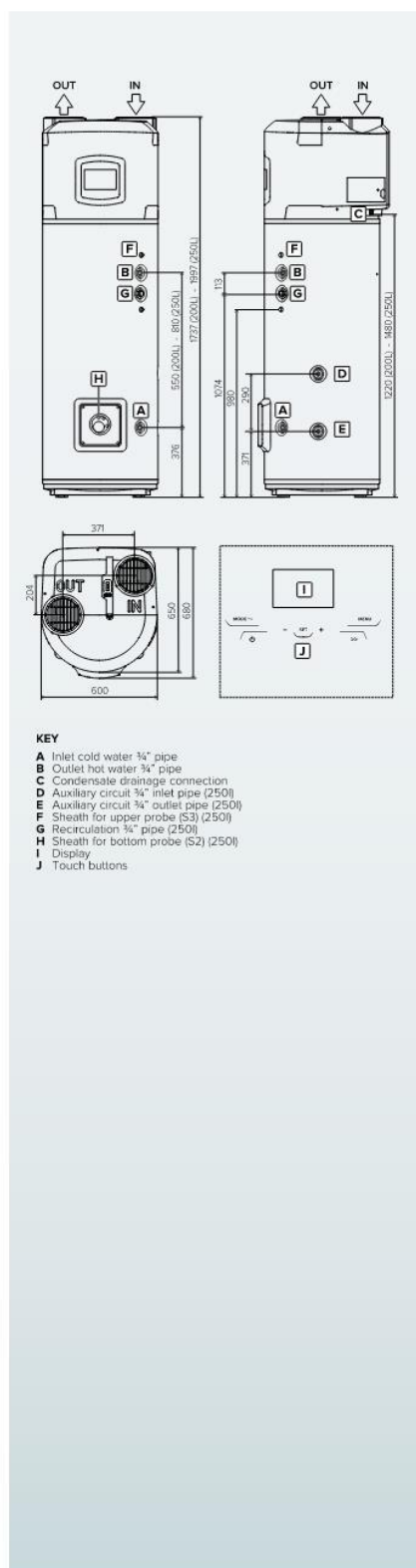
Heat Pump Water Heater

- / Under 4 hour heat up time, lowest on the market*
- / Highly Efficient COP of 3.14**
- / Optional Wi-Fi control via Aqua Ariston Net app
- / "Plug & Play" no F-Gas qualifications needed to install
- / Extended operating temperature range (-10° to 42°C)
- / R134a eco-friendly refrigerant gas for water temperatures up to 62°C in heat pump mode
- / Brand new working modes including daily/weekly programming and I-Memory
- / Full system integration with Ariston boilers through Sensys controls thanks to BusBridgeNet technology**
- / 80% more energy savings than traditional cylinders of the same capacity
- / Super silent at 51dB in Silent Mode, equivalent to a domestic fridge-freezer
- / Active anode (ProTech) & magnesium anode
- / Titanium enamelled steel tank

*Nuos Plus Wi-Fi 200D only

**Nuos Plus Wi-Fi 250I only





Nuos Plus Wi-Fi datasheet/May 23

TECHNICAL DATA		200D	250I
COP*		3,10	3,14
Heating time*	h:min	03:59	05:24
Min/max air temperature	°C	-10/42	-10/42
Max water temperature heat pump only mode/with HE	°C	62/75	62/75
Min temperature of storage tank room	°C	1	1
Nominal storage tank capacity	l	200	245
Sound power level**	dB(A)	55	55
Sound power level (silent mode)	dB(A)	51	51
Max operating pressure	bar	6	6
Voltage/max power consumption	V/W	220-240/2500	220-240/2500
Heating element power	W	1500+1000	1500+1000
Max electrical power consumption in heat pump mode	W	900	900
Electrical system protection grade		IPX4	IPX4
Standard air flow rate (automatic modulating control)	m³/h	650	650
Min volume of the installation room***	m³	30	30
Empty weight	kg	90	115
Insulation thickness	mm	50	50
Heat exchanger surface area	m²	-	0,65
Heat dispersion (Pes)*	W	21	23
Available static pressure	Pa	230	230
Annual electricity consumption (average clima)****	kWh/year	790	1,299
Seasonal efficiency (nwh)****	%	130	129
Mixed water at 40°C (V40)****	l	256	333
F-GAS DATA			
Refrigerant type		R-134a	R-134a
Refrigerant charge	kg	1,3	1,3
GWP		1430	1430
CO2 equivalents	t	1,86	1,86
PERFORMANCE			
Energy rating		A+	A+
Tapping profile		L	XL
CODE (including unvented kit)		3820027	3820028

* Values obtained with outdoor air temperature of 7°C and relative humidity of 87%. Inlet water temperature of 10°C and temperature set at 55°C (as per the provisions in EN 16147 and CDC 103-15/C-2018). Ducted product Ø200 mm.

** Values obtained from the average of the results as per the provisions in EN 12102-2. Ducted product Ø200 mm.

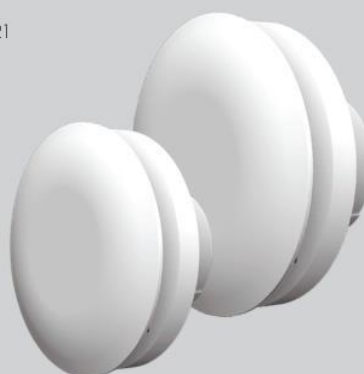
*** Value that guarantees the correct operation and easy maintenance with non-ducted products. The correct operation of the product is nevertheless guaranteed up to a minimum height of 2,090m.

**** Values obtained with outdoor air temperature of 7°C and relative humidity of 87%. Inlet water temperature of 10°C and temperature set at 55°C (as per the provisions of 2014/C 207/03 - transitional methods of measurement and calculation). Ducted product Ø200 mm.

Appendix E – Proposed dMEV Product Information

Lo-Carbon NBR dMEV C

- Continuously running 100mm and 125mm dMEV with sleek circular design
- Designed to comply with the latest Building Regulations Parts L1A and F 2021
- SAP PCDB listed with SFP's down to 0.08 W/l/s
- Near silent operation independently tested
- IPX5 rated, wall and ceiling mounted Zones 1, 2 and 3
- Low ceiling void - 56mm (100mm spigot) and 66mm (125mm spigot)
- Easy to commission, fully adjustable variable control platform
- Intelligent humidistat model option with proportional increase and timer
- Comfort control option
- 7- year warranty



Lo-Carbon NBR dMEV C

Increased whole ventilation rates, should not mean increased noise levels. The Vent-Axia Lo-Carbon NBR dMEV C fan, available in 100mm and 125mm, provides adequate ventilation whilst minimising noise.

The fan is designed in line with the Approved Document F 2021 Building Regulations, meeting the increased whole house ventilation rates.

Table 1.3 - Minimum whole dwelling ventilation rates determined by the numbers of bedrooms.

No. of bedrooms	2013 Edition	2021 Edition	Increase
1	13l/s	19l/s	46%
2	17l/s	25l/s	47%
3	21l/s	31l/s	47%
4	25l/s	37l/s	48%
5	43l/s	43l/s	48%

The minimum whole dwelling ventilation rate for the supply air should meet the higher of the two following result:

- A minimum rate of 0.3l/s per m² of internal floors area
- A minimum rate determined by the number of bedroom, as per Table 1.3

Nuisance tripping has also been minimised within the fan logic. The integral humidity sensor versions have functionality that allows for proportional speed increase up to 85% relative humidity (RH) before enabling Boost.

The Lo-Carbon NBR dMEV C is complete with IPX5 rating, allowing flexible installation within Zone 1, 2 and 3.

A back pressure detection system option is available, to Boost if the system pressure increase momentarily due to external wind conditions. A silent mixed flow impeller means the Lo-Carbon NBR dMEV C can meet the requirements of many domestic installations without the need to use a traditional centrifugal fan.

A brand new control platform also provides fully adjustable airflow, meaning wholehouse rates can be achieved easily using fewer fans.

Comfort Control Option

Designed to offer a more relaxing environment to the homeowner, the Lo-Carbon NBR dMEV C features a delayed start. This patented comfort control option allows the homeowner to enjoy a quiet, peaceful bathroom for up to 20 minutes before the Boost activates. Furthermore, if the light switch turns On and Off within three minutes, the Boost will not activate. No more disturbing the family if the bathroom light is turned on during the night.

Near Silent Operation

The fan has been designed to be as discreet as possible for homeowners, with independently tested sound levels as low as 7.4dB(A).



Vent-Axia

Model

Lo-Carbon NBR dMEV C

For kitchen, utility and bathroom/toilet applications, the continuous running dMEV C fan is available as standard or as a humidistat model which incorporates an ambient response humidistat. The fan will increase the extract rate if the humidity rises above the point set at installation. Both fans will have optional Comfort Control, which includes a timer function.

Variable speed setting

Model	Stock Ref
Lo-Carbon NBR dMEV C 100	498095
Lo-Carbon NBR dMEV C 100 HT	498096

Variable speed setting

Model	Stock Ref
Lo-Carbon NBR dMEV C 125	498097
Lo-Carbon NBR dMEV C 125 HT	498098

Accessories

Model	Stock Ref
Wall Kit White 100mm	254102
Wall Kit Brown 100mm	254100
Wall Kit White 125mm	455226
Wall Kit Brown 125mm	497434
Wall Kit Terracotta 125mm	497432

Consultant Specification

The de-centralised mechanical extract ventilation unit shall be the Lo-Carbon NBR dMEV C as manufactured by Vent-Axia, exact unit sizing and specification shall be in accordance with the particular specification.

The range should consist of IPX5 rated 100mm and 125mm sizes to meet the Building Regulations compliant design, extracting air from wet rooms (including kitchen and utility) via rigid, flexible ducting or through-wall applications with the fewest fans possible, supplied with a 7-year warranty.

The 100mm Lo-Carbon NBR dMEV C should have variable speed settings of 5-26 l/s achieving a minimum noise level of 7.4dB(A) at 3 metres. The 125mm Lo-Carbon NBR dMEV C should have variable speed settings of 5-35 l/s achieving a minimum noise level of 8.5dB(A) at 3 metres. All sound pressure levels are quoted at hemispherical measurements. All units shall be and independently third-party tested at the Sound Research Laboratory (SRL), tested to BS EN 13141-6.

The unit shall comprise a single high efficiency EC/DC motor to deliver specific fan powers as low as 0.08 W/l/s, as measured in accordance with the SAP PCDB test method and listed on the PCDB database.

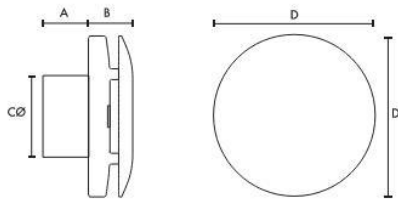
The controls for the Lo-Carbon NBR dMEV C unit shall provide fully adjustable, continuous whole house ventilation rates. The Boost speed shall be activated via an integral humidistat or via LS Input.

The fan shall be compatible with low ceiling voids and have a spigot length of 56mm (100mm) and 66mm (125mm).

The fan shall have the nuisance tripping prevention option called Comfort Control, which stops the fan from engaging Boost when the LS input is engaged for less than three minutes.

The unit shall be able to be commissioned as a continuous running fan according to the Building Regulations compliant design.

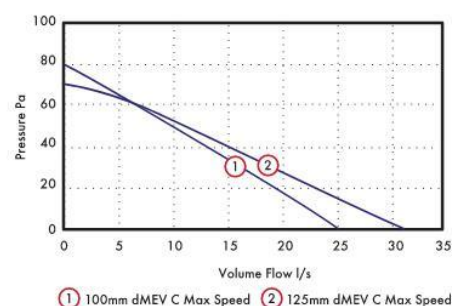
Dimensions (mm)



Model	A	B	CØ	D
100	56	54	99	195
125	66	57	120	228



Performance Guide



Sound

Model	Speed	dB(A)
100	Min	7.4
	Max	34.3
125	Min	8.5
	Max	37.9

SAP PCDB Performance 2021

Unit configuration	Location	100 Model	125 Model
In room (Rigid duct)	Kitchen (13l/s)	0.14	0.14
	Kitchen/wet room (8l/s)	0.11	0.12
Through wall	Kitchen (13l/s)	0.08	0.09
	Kitchen/wet room (8l/s)	0.08	0.10

Vent-Axia