



Sustainability Statement

Cherryfield Drive, Kirkby

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Revision History

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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.

Over the last decade, we have provided assessments and consultancy for some of the largest UK house builders, including Barratt Developments, David Wilson Homes, Bellway Homes, Abbey New Homes and Davidsons. 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)*
 - *Part F (ventilation)*
 - *Part G (water)*
- *Overheating 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 David Wilson Homes North West to prepare a sustainability statement for the residential site Cherryfield Drive, Kirkby. This document sets out how the development proposal presents a positive sustainable development.
- 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 Knowsley Local Plan.
- 1.1.3. The proposed development is designed to achieve carbon emissions in line with Part L 2021 through the adoption of good fabric performance and employment of low and zero carbon technologies.
- 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. Potential overheating risk will be assessed in accordance with the newly released Approved Document O.
- 1.1.6. The proposed development is situated in Flood Zone 1, in line with Policy CS24 of the Knowsley Local Plan.
- 1.1.7. 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. This level of water use is in line with Policy CS22 of the Knowsley Local Plan.
- 1.1.8. Waste management has been considered in line with Policy CS26 of the Knowsley Local Plan.
- 1.1.9. 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.

2. Project Overview

2.1. Description of Site

- 2.1.1. The site proposal consists of the construction of 800 residential dwellings which include detached, semi-detached and terraced houses, along with an apartment block.
- 2.1.2. The proposed site plan is shown in Appendix A.

2.2. Brief

- 2.2.1. The planning authority for this site is Knowsley Council. The local plan containing the relevant planning policy is the Knowsley Local Plan.
- 2.2.2. Within the Local Plan there are several relevant policies which are addressed herein.

2.2.3. Policy CS22

Sustainable and Low Carbon Development

Sustainable Construction Principles

1) New development will be required to meet high standards of sustainable design and construction and minimise carbon emissions. This should be achieved by:

- a) Designing new buildings for flexible uses throughout their lifetime;*
- b) Avoiding the creation of adverse local climate conditions by using natural systems to avoid internal overheating and excessive heat generation;*
- c) Ensuring developments are comfortable and safe for users;*
- d) Making the most effective and sustainable use of water, aggregates and other resources;*
- e) Limiting energy use by incorporating high standards of insulation, heat retention, natural ventilation and passive solar techniques;*
- f) Landscaping (including measures such as green walls or roofs) to create shelter and reduce any heat island effect;*
- g) Using sustainable materials from local suppliers where possible;*
- h) Supplying energy efficiently and incorporating decentralised energy systems, using renewable and low carbon energy where feasible;*
- i) Managing flood risk, including through the use of Sustainable Drainage Systems (SuDS) and flood resilient design for infrastructure and property; and*
- j) Promoting sustainable waste practices in new and existing developments.*

Low Carbon Development, Community Energy Fund and Allowable Solutions

2) Government targets for carbon reduction in new development are expected to be implemented through updates to the Building Regulations. Where it is not technically feasible or economically viable to meet the requirements on site, contributions to the Council's Community Energy Fund may be accepted as one of a range of options under the Government's proposed 'Allowable Solutions' mechanism. The Fund will be used to support carbon reduction initiatives in Knowsley and potentially the wider Liverpool City Region.

Sustainable Construction Targets

3) Local targets for sustainability in relation to specific development areas or sites may be outlined in the Local Plan: Site Allocations and Development Policies.

Priority Zones and Decentralised Energy Networks

4) Knowsley Industrial Park and Knowsley Business Park are identified as a 'Priority Zone'. Within this area the Council and its partners will facilitate renewable and low carbon infrastructure by (subject to feasibility) requiring new development to:

- a) Make provision for connection to an existing or planned decentralised energy network; and*
 - b) Be designed to enable future connectivity in terms of proposed site layout, infrastructure and heating provision, including consideration of connections at a later date or phase.*
- 5) Subject to opportunity and need, additional 'Priority Zones' may be identified in the Local Plan: Site Allocations and Development Policies.*

2.2.4. Policy CS24

Managing Flood Risk

- 1) New development that may cause an unacceptable risk of flooding on the site or elsewhere will not be permitted.*
- 2) New development should preferably be located in areas of low probability of flooding. New development in areas of medium or high flood risk will only be permitted if evidence has been submitted demonstrating that the development could not be practicably located in an area of lower flood risk and if applicable the 'exception test' has been complied with, in accordance with national guidance.*
- 3) All development which is within or otherwise affects an area of flood risk or is larger than one hectare in size shall be accompanied by a site-specific Flood Risk Assessment (FRA).*
- 4) New development shall include flood mitigation measures, where necessary, to manage flood risk associated with or caused by the development. These measures shall be derived from the Strategic Flood Risk Assessment (SFRA), relevant FRA(s) or a local strategy for flood risk management, and:*
 - a) Be designed to contribute to the biodiversity of the borough unless it can be demonstrated that this would not be technically feasible;*
 - b) Incorporate a Sustainable Drainage System;*
 - c) Be fully described in the planning application; and*
 - d) Be funded by the developer, including long term maintenance.*
- 5) The drainage of new development shall be designed to reduce surface water run-off rates to those associated with a green-field site by treating it at its source. The chosen method of implementation should take account of site size, ground contamination or conditions, and potential damage to adjacent buildings or sites.*
- 6) Further guidance on these issues will be provided in a proposed Supplementary Planning Document.*

2.2.5. Policy CS26

Waste Management

- 1) The Council will promote sustainable forms of waste management in accordance with the waste hierarchy. As set out in the Merseyside and Halton Joint Waste Local Plan, it will work to:*
 - a) Identify and safeguard (where appropriate) waste management sites in appropriate locations;*
 - b) Ensure that the borough contributes to meeting the identified sub-regional waste management needs;*
 - c) Encourage good design in new development in order to minimise waste, promote the use of reclaimed and recycled materials and to facilitate the collection and recycling of waste;*
 - d) Encourage the sustainable transport of waste and promote use of site waste management plans; and*
 - e) Ensure that waste management facilities are developed whilst minimising any negative impacts on the environment and communities of the borough.*

- 2.2.6. This report seeks to address the planning policies relevant for the proposed site and present a sustainable strategy.
- 2.2.7. 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. The newly implemented Approved Document L 2021 (AD-L 2021) provides for a 31% reduction in Carbon emissions over the previous 2013 edition.
- 2.3.2. AD-L 2021 came into effect 15th June 2022, with a 12 months transitional arrangement. Sites which have been notified to local authorities prior to this date have 12 months transitional allowance on a plot by plot basis. That is to say if a plot has commenced construction prior to 15th June 2023 it will be built under AD-L 2013. It is understood that Cherryfield Drive will be developed in accordance with AD-L 2021.

3. Sustainability Appraisal

3.1. Green Guide Specification

- 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 standard specification of materials used by Barratt Homes consists 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.
- 3.1.3. Table 1 below shows a sample of materials used by Barratt Homes and their Green Guide rating.

Table 1

<i>Element</i>	<i>Green Guide Equivalent (online)</i>	<i>Code</i>	<i>Rating</i>
Ground Floor Option A (Beam and Aircrete Block)	Screed on insulation laid on grouted beam and Aircrete block flooring.	820140014	B
Ground Floor Option B (Ground Bearing)	Powerfloated in situ concrete slab, over insulation on polyethylene DPM laid on blinded virgin aggregate sub-base	820100202	C
Internal Upper Floors	Chipboard decking on timber I joists	807280024	A+
Wall – External Cavity (single & 2 storey) – Brick	Brickwork outer leaf, insulation, Aircrete blockwork inner leaf, cement mortar, plasterboard on battens, paint	806170615	A+
Wall – External Timber Frame (single and 2 storey)	UK produced natural slate on timber battens, breather membrane, OSB/3 sheathing, timber frame with insulation, vapour control layer, plasterboard on battens, paint	806210566	A+
Wall – Internal Partition (timber) non loadbearing	Timber stud, plasterboard, paint	809760003	A+
Wall – Internal Partitions (masonry) (Used in very small number of cases)	Medium dense solid blockwork, plasterboard, paint	809180008	B
Wall – Party (cavity)	Robust Detail E-WM-20: Twin leaf 100mm min. solid medium dense blocks (1350-1600kg/m ³), with 100mm min. cavity including proprietary glass wool acoustic roll, type A wall ties, with gypsum-based board (9.8kg/m ²) on dabs and paint to each side	1118190007	C
Windows	PVC-U window with steel reinforcement, double glazed	813100009	A
Insulation	Glass wool insulation - density 12 kg/m ³	815320001	A+
Pitched Roof	Timber trussed rafters and joists with insulation, roofing underlay, counterbattens, battens and concrete plain tiles	812410017	A+

3.2. Responsible Sourcing

- 3.2.1. BDW has an established network of responsible sourcing certified suppliers that have been carefully selected to align with sustainability and responsible sourcing policies.
- 3.2.2. Materials used within construction of the proposed development will be at a certified standard, proving the materials sourced have been done so with sustainability in mind.
- 3.2.3. Responsible sourcing of materials can come in a variety of certifications including: BES 6001, FSC, PEFC and EMS.
- 3.2.4. Appendix B shows a wide range of Barratt's suppliers with material responsible sourcing certification including:
- *Wallboard supplier British Gypsum;*
 - *Aggregate/cement product supplier Tarmac.*
 - *Aircrete block supplier H+H Celcon;*
 - *Brick supplier Ibstock Brick.*
- 3.2.5. Additionally, the site aims to utilise timber that is procured sustainably and independently accredited by either the FSC or PEFC schemes. The Barratt Homes Sustainable Procurement Policy can be seen in Appendix C. The policy sets a high standard of sustainability when sourcing materials.
- 3.2.6. The level of responsible sourcing to be utilised during the construction stage of this development complies with requirements set out in Policy CS22 of the Knowsley Local Plan.

3.3. Waste Management

- 3.3.1. Appendix D shows an extract of BDW's Sustainability Framework 2020+ that sets targets for waste management including at least 95% construction waste diverted from landfill as well as continued reductions in construction waste intensity.
- 3.3.2. The scheme 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. BDW achieved 97% of construction waste diverted from landfill in 2018 and BDW's Sustainability Framework 2020+ sets targets to continue diversion from landfill and reduce construction waste intensity.
- 3.3.3. It is understood that a Site Waste Management Plan will be utilised during the construction stage of this development.
- 3.3.4. The waste management principles utilised in this development such as the use of a Site Waste Management Plan is in line with requirements set out in both Policy CS22 and CS26 of the Knowsley Local Plan.

3.4. Flood Risk

- 3.4.1. Appendix E 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. This therefore complies with Policy CS24 of the Knowsley Local Plan.

3.5. Ecology

- 3.5.1. A full Ecology Assessment and Report has been produced for this development.
- 3.5.2. The Ecology Assessment and Report 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.
- 3.5.3. Full details of the recommended approach to ecology can be found in the associated report.

3.6. Sustainable Urban Drainage

- 3.6.1. Full SuDS Report and Flood Risk Assessments have been carried out for this development.
- 3.6.2. 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.
- 3.6.3. Full details of the recommendations put forward can be found in the associated report.
- 3.6.4. The reports outline how the development complies with any requirements laid out in Policies CS22 and CS24 of the Knowsley Local Plan.

3.7. Air Quality

- 3.7.1. A full Air Quality Assessment has been carried out for this development.
- 3.7.2. The Air Quality Assessment report includes information on potential mitigation measures which could be implemented for the site to reduce impacts on the quality of air in the vicinity of the development.
- 3.7.3. Full details of the Air Quality Assessment can be found in the associated report.

3.8. Electric Vehicle Charging

- 3.8.1. Providing EV charging points or the ability to retrofit EV charging points is an exemplary measure for sustainability and promotes sustainable lifestyles for residents.
- 3.8.2. 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, November 2020).
- 3.8.3. 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 1 below which shows common infrastructure side connections for Mode 2 and 3.

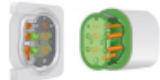
CONNECTOR TYPE	BS 1363	BS EN 60309-2	BS EN 62196-2 TYPE 2	BS EN 62196-2 TYPE 3
				
MODE	2	2	3	3
MAX POWER (kW) (at mains voltage i.e. harmonised EU voltages)	Single phase - 3	Single phase - 28.8 Three phase - 86.6	Single phase - 16.1 Three phase - 43.7	Single phase - 7.4 Three phase - 43.7
NOTES	Standard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

Figure 1 – Common infrastructure options for Mode 2 and 3 EV charging points (BEAMA, 2015)

- 3.8.4. It is currently proposed that there will be provision of one EV charging point for all plots.
- 3.8.5. The full specification of these charging points will be determined during detailed design stage.
- 3.8.6. The development therefore complies with Approved Document S of the 2021 Building Regulations.

3.9. Water Use

3.9.1. 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).

3.9.2. 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.

3.9.3. The development therefore complies with water use targets set out in Policy CS22 of the Knowsley Local Plan.

		(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 (single flush)	Flush volume (litres)	-	4.42	0.00	0
WC (dual flush)	Full flush volume (litres)	4	1.46	0.00	5.84
	Part flush volume (litres)	2.6	2.96	0.00	7.696
WCs (multiple fittings)	Average effective flushing volume (litres)	-	4.42	0.00	0
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
Bath only	Capacity to overflow (litres)	-	0.50	0.00	0
Shower only	Flow rate (litres/minute)	-	5.60	0.00	0
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
Waste disposal unit	Litres/use (If present = 1 If absent = 0)	0	3.08	0.00	0
Water softener	Litres/person/day	-	1.00	0.00	0
	(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)] × (8)			104.9
	(10)	External water use			5.0
Approved Document G	(11)	Total water consumption = (9) + (10) (litres/person/day)			109.9

3.10. Overheating Risk

- 3.10.1. To minimise the risk of overheating, large areas of glazing facing West or South should be avoided as these are the most onerous directions. Such glazing is particularly applicable to habitable rooms where occupants will need to feel thermally comfortable.
- 3.10.2. Low g-factor windows allow less solar radiation in the dwelling and typically, these would be double and triple glazed windows.
- 3.10.3. Ideally, windows should be able to open as wide as the regulations allow to maximise natural ventilation and allow cross ventilation. Reasons why windows may not be able to open as wide could be to do with noise and air pollution and security issues. Where these problems exist, it is difficult to mitigate overheating risks passively, and mechanical means would need to be considered.
- 3.10.4. A full overheating assessment and report is to be completed to show compliance with Approved Document O.

4. Design Response

4.1. Assessment Methodology

4.1.1. Environmental Economics will model the proposed dwellings using the software Design SAP 10 by Elmhurst and approved by BRE. 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. SAP software is issued by independent software suppliers, and checked and approved on behalf of government by the Building Research Establishment (BRE).

4.1.4. The dwellings on the proposed development will be assessed using this methodology during the detailed design 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. The site adopts the good design principles endorsed and promoted by The Zero Carbon Hub, the construction industries' key advisors and partners with the Governments Communities and Local Government Department. This guidance follows the general good principles of energy efficiency as the industry moves towards zero carbon. The principles are illustrated in Figure 2 below.

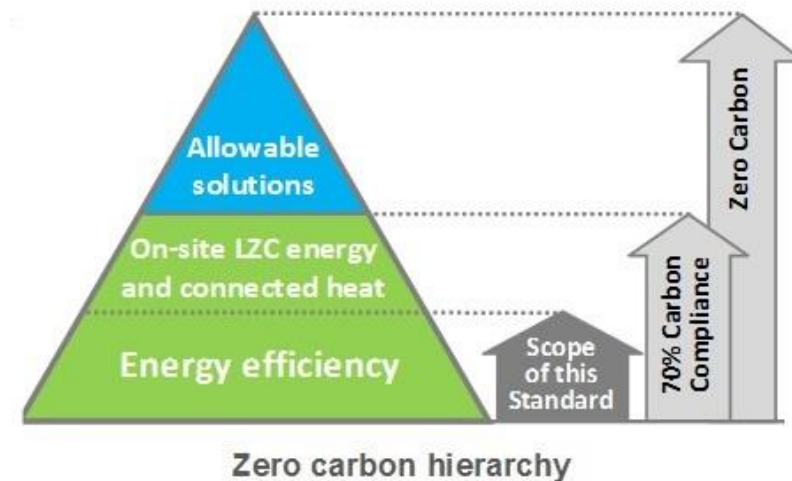


Figure 2

4.2.2. In order 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;*
- *Delayed start thermostat;*
- *Design air permeability of 4.00m³/hr/m²;*
- *Bespoke thermal bridging details.*

4.3. Fabric Improvements Part L1A 2021

4.3.1. The building fabric for all dwellings was improved from the minimum standards required to an enhanced specification. These fabric improvements reduce the space heating requirement upon a property. The improvements have been 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. Changes to the U-Value of external elements for dwellings built to Part L 2021 are shown in Table 2 below.

Table 2 – Part L 2021 Build Specification

<i>Element</i>	<i>Minimum Standard</i>	<i>Improved Specification</i>	
-	<i>W/m²k</i>	<i>Description</i>	<i>W/m²k</i>
Walls	0.26	Insulated timber frame	0.20
Roof	0.16	500mm Mineral Wool Horizontal Ceiling, Loft Space	0.09
		Sloping Ceiling to have 100mm PUR between joists, and 55mm PUR Board underlaid	0.15
Floors	0.18	225mm TE Platinum Insulation	0.10 - 0.12
Doors	1.60	Double glazed Low-E, u-PVC frame	1.00 - 1.60
Glazing	1.60	Double glazed Low-E, u-PVC frame	1.30

- 4.3.2. Please note that this specification is not finalised and is subject to change up until detailed design stage.
- 4.3.3. As improvements are made to the thermal conductivity of main elements, thermal bridging and air permeability becomes increasingly significant in the overall fabric performance. Bespoke thermal bridging designs have been utilised, which achieve much lower heat loss levels in comparison with standard practice.
- 4.3.4. As a result of following these junction details and focusing on build quality air permeability will also decrease. A target air pressure rating of 4.00m³/hr.m² has been set for all houses on site 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 control it, are important to the overall energy demand of a property. AD-L 2021 includes requirements for efficiency and controls of such equipment, including space heating, water heating, ventilation and lighting.
- 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 F) the design team propose to adopt the following technologies which provide benefits / compliance with national and local policies as listed:
- **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.*
 - **Waste Water Heat Recovery (WWHR):**
 - Passive technology, no maintenance required;
 - Recovers waste heat from shower, pre-heats incoming cold. This mitigates the amount of hot water required from the hot water cylinder;
 - Typical systems recover ~60% waste heat.
 - **Air source heat pump (ASHP):**
 - No connection to the gas grid;
 - Uses grid electricity as the fuel;
 - Provides 100% space heating and domestic hot water;
 - Minimum co-efficient of performance over 2.5 (250% efficient);
 - ASHP 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).

- 4.4.4. It is currently proposed that PV panels and WWHR will be used to improve dwelling performance to the level required for Part L 2021. The amount of PV which will be required for this development is to be calculated at the detailed design stage.
- 4.4.5. For Part L 2021 it is currently proposed to provide heating and hot water via mains gas boilers.
- 4.4.6. 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.
- 4.4.7. The potential ASHP will also be considered for this development.
- 4.4.8. The future direction of travel for the UK is to implement a low carbon electricity network which will become the main fuel for residential heating and hot water. However, as the development is a low density housing project with a lack of land available for an energy centre, guidance issued by the Greater London Authority (below) suggests that heat networks are currently inappropriate for this kind of development:
- 9.34. Depending of the density of development, it may not always be appropriate to connect individual houses to heat networks. This is due to the higher network heat losses that typically occur when supplying individual houses that generally have a lower heat density compared to apartments. They also have a higher cost of connection.*
- 4.4.9. 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.
- 4.4.10. 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 sustainability statement has been produced for the residential site Cherryfield Drive, Kirkby.
- 5.1.2. 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 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, ecology and air quality assessments;
 - The provision of EV charging points to all plots;
 - 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 PV and WWHR to achieve the efficiency levels required under Part L 2021.
- 5.1.3. It should be noted that future policies and building regulations may require an update to the sustainability measures within this report.
- 5.1.4. The proposed site is found to present a positive sustainable development based on the assessed sustainability criteria and exceeds current standards with an exemplary strategy.

Appendix A – Proposed Site Layout



Appendix B – Responsible Sourcing Certificates



Certificate of Registration

RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS

This is to certify that:

Saint-Gobain Construction Products
UK Limited
T/A British Gypsum
Head Office
East Leake
Loughborough
LE12 6HX
United Kingdom

Holds Certificate Number:

BES 613170

and complies with the requirements of BES 6001: Issue 3.1 - Framework Standard for the Responsible Sourcing of Construction Products for the following scope. This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology and underpinning processes.

Product Group: Gyproc plasterboard, Glasroc specialist board, Thistle Plaster, Cove products, Gyproc accessories. Overall Assessment Score: Excellent Amended scope should rea and replace above Gyproc plasterboard, Glasroc specialist board, Thistle Plaster, Gyproc Cove, Gyproc ready-mix joint cement. Overall Assessment Score: Excellent

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2014-10-13

Effective Date: 2020-09-01

Latest Revision Date: 2020-08-11

Expiry Date: 2023-08-31



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Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowlhill, Milton Keynes MK5 8PR. Tel: +44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.



Certificate of Registration

RESPONSIBLE SOURCING OF PRODUCTS

This is to certify that:



Tarmac
part of Tarmac Holdings Limited
Portland House
Bickenhill Lane
Solihull
B37 7BQ
United Kingdom

Holds Certificate Number:

BES 567267

and complies with the requirements of BES 6001: Issue 3.1 - Framework Standard for the Responsible Sourcing of Products for the following scope. This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology and underpinning processes.

Product Group: Building Products

Overall Assessment Score - Excellent

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2010-09-20

Latest Revision Date: 2020-12-14

Effective Date: 2021-03-01

Expiry Date: 2024-02-29



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Certificate of Registration

RESPONSIBLE SOURCING OF PRODUCTS

This is to certify that:

H+H UK Limited
Ightham Sandpits
Borough Green Road
Ightham
Sevenoaks
TN15 9JB
United Kingdom

Holds Certificate Number:

BES 636778

and complies with the requirements of BES 6001: Issue 3.1 - Framework Standard for the Responsible Sourcing of Products for the following scope. This Responsible Sourcing certification has been carried out under licence using BRE's Responsible Sourcing scheme methodology and underpinning processes.

Product Group: Solar Aircrete Blocks, Standard Aircrete Blocks, High Strength Aircrete Blocks, Super Strength Aircrete Blocks, Coursing Units.

Overall Assessment Score: Very Good.

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2015-07-23

Latest Revision Date: 2021-07-07

Effective Date: 2021-07-23

Expiry Date: 2024-07-22



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A Member of the BSI Group of Companies.



Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Ibstock Brick Ltd
Leicester Road
Ibstock
LE67 6HS
United Kingdom

Holds Certificate Number:

FS 738379

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

**The design, development and manufacture of clay bricks, special shapes.
The supply of architectural and design consultancy for brick, brickwork, terracotta
and cast stone.**

For and on behalf of BSI:

Andrew Launn, EMEA Systems Certification Director

Original Registration Date: 2018-10-23

Latest Revision Date: 2021-09-20

Effective Date: 2021-10-23

Expiry Date: 2024-10-22



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Appendix C – Sustainable Procurement Policy

Sustainable Procurement Policy

Introduction

By its very nature our business has environmental and social impacts. Accordingly, we are committed to continuously safeguarding the environment and maintaining good labour relations by:

- Working with suppliers, contractors and supply chains to minimise the environmental and social impact of the materials, services and labour within our operations and supply chain that are integral to our business; and
- Developing commercial relationships with partners that embrace sustainable practices and spread best practice through the supply chain.

This Policy sets out a framework that we expect our supply chain partners to apply and relates to both the products/services they provide to us and the operating activities that they and their respective supply chains are engaged in.

The Policy

The key elements of our Policy relating to suppliers and subcontractors are:

- Suppliers must ensure compliance to all mandatory legislation that affects their activities and those of their own supply chain.

- Suppliers must conform to the specific requirements of our health, safety, environmental, quality and responsible sourcing requirements.
- Suppliers must maintain a Health and Safety Management System that is of a suitable standard for the operations they are engaged in. As a preference, organisations should gain certification to OHSAS:18001.

Suppliers and subcontractors must commit to follow our supplier code of conduct. [www.barrattcommercialsupport.co.uk]

Suppliers must maintain an ethical sourcing policy that aims to ensure as a minimum that:

- All statutory legislation (in their country of operation) is adhered to;
- Working conditions are safe and healthy;
- No child, forced or slave labour takes place and the requirements of the International Labour Organisation's conventions are complied with;



Sustainable Procurement Policy

- All employees are paid a real Living Wage which is the hourly rate set by the Living Wage Foundation, is based on cost of living and is higher than the legal minimum (see <https://www.livingwage.org.uk/>);
 - No individual is expected to work excessive hours; and
 - There is no discrimination on the grounds of ethnicity, skin colour, gender, sexual orientation, age or other criteria.
- c) Have low embodied carbon (against BRE Green Guide);
 - d) Utilise less material by design;
 - e) Can be recycled;
 - f) Minimise packaging waste;
 - g) Minimise use of water;
 - h) Use local resources; and
 - i) Conform to Responsible Sourcing Standard: BES6001.

Our suppliers and subcontractors must be prepared to demonstrate how they monitor compliance with these requirements on request.

We will use sustainability criteria including environmental & social impact, quality and price in the assessment and selection of future supply sources.

We will include appropriate sustainability criteria in our tender and contract documentation. Where materials can be ethically sourced (and are economically viable and have equivalent quality and technical performance to alternative offerings), a preference will be given to materials that:

- a) Have a recycled content (with reference to WRAP – Recycled Content Product Guide);
- b) Minimise ecological damage;

This policy underpins our Group Sustainability, Climate Change and Environment Policies, and is supported by our Timber Sourcing Policy.

This policy is reviewed annually and is approved by the Group Board. It is communicated to key stakeholders and is available on our website.

David Thomas, Chief Executive
13th October 2020



Appendix D – Waste Management Targets

Barratt Developments, October 2019

barrattddevelopments.co.uk/sustainability

5

INNOVATIVE EFFICIENT CONSTRUCTION

Our ambition is to minimise our use of materials and energy, reduce waste generation and maximise low carbon opportunities in all aspects of our business through innovation and development.



MODERN METHODS OF CONSTRUCTION (MMC)

OUR TARGET

To apply MMC based products and systems in 20% of our homes by 2020 and 25% by 2025.

ACTIONS

- Increase roll out of low embodied carbon timber frame, offsite ground floor systems and large format blocks.
- Investigate a viable MMC system for apartments.

CONSTRUCTION WASTE

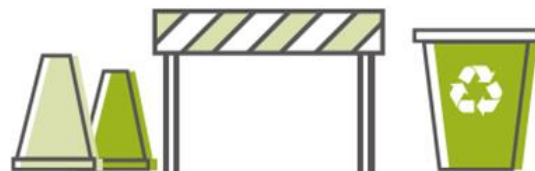
OUR TARGET

To reduce construction waste intensity by 20% from 2015 levels by 2025 (to 5.67t per 100m² legally completed build area).

To maintain diversion from landfill rate at 95% for construction waste.

ACTIONS

- Use the findings from our traditional/timber frame build comparison study to inform our waste reduction plans.
- Increase uptake of suitably sized plasterboards across divisions to avoid off-cuts.
- Work with suppliers and sub-contractors to find ways to reduce waste from chipboard packs and single-use plastics across our supply chain.
- Return 300,000 pallets for repairing, re-use and recycling.



Appendix E – Flood Risk Map (Zone 1)



Flood map for planning

Your reference
Kirkby

Location (easting/northing)
341091/398391

Created
27 Oct 2023 12:47

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)

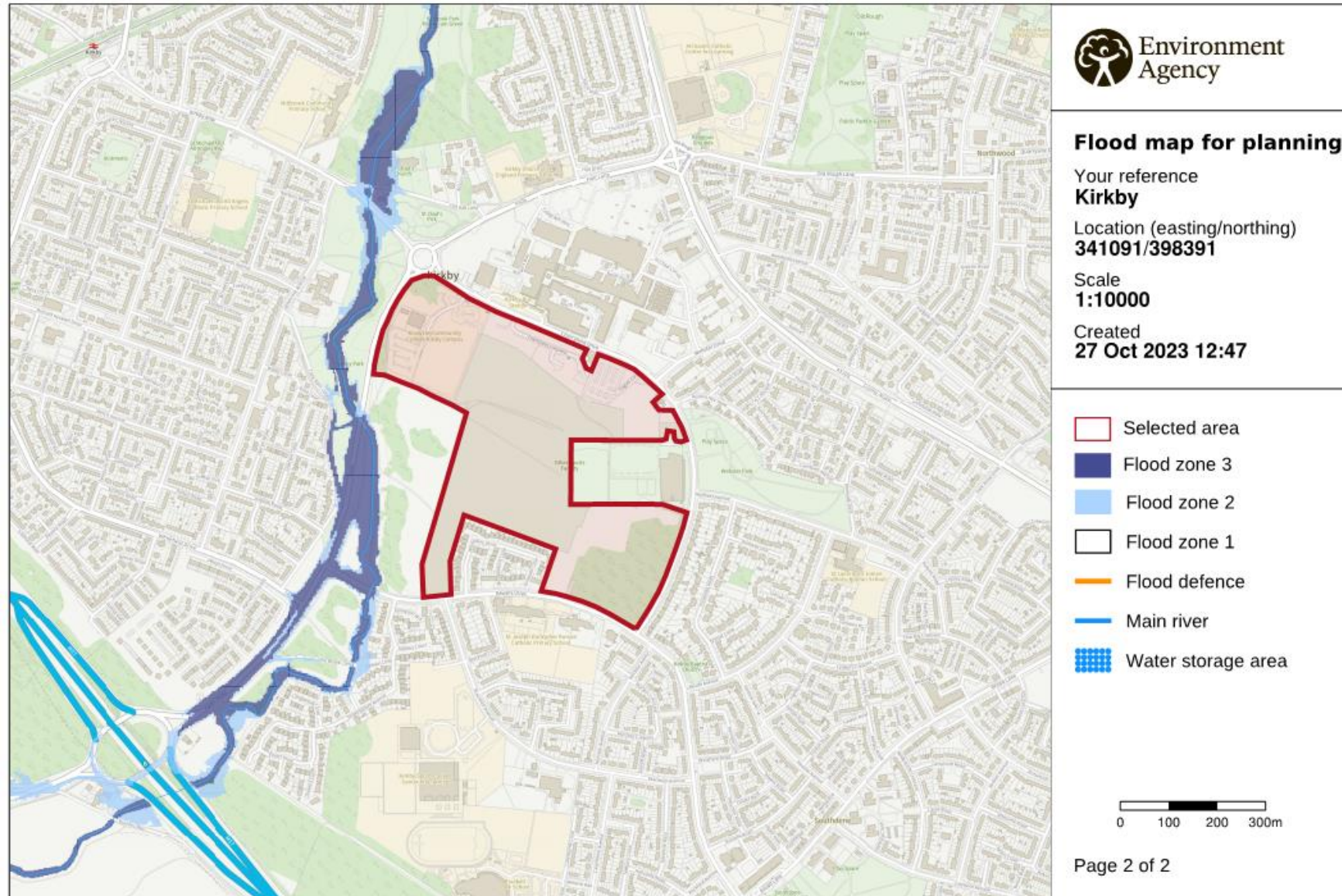
Notes

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 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



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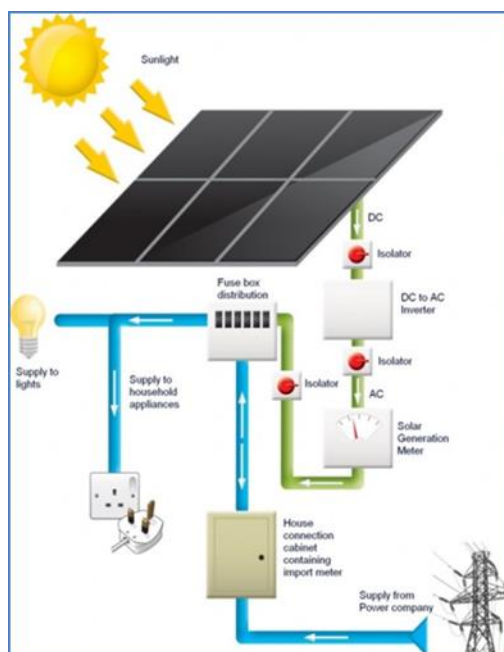
Appendix F – Low and Zero Carbon Technologies

Photovoltaic (PV) Cells

The efficiency of PV cells has improved rapidly over the last 15 years. This has made a previously uneconomical technology an increasingly viable solution to rising energy costs and demand. The cells can be produced in a variety of formats but are typically manufactured as a panel or a roof tile for domestic housing applications.

The PV system typically produces direct current (DC) which is then sent through an inverter to supply the house with electricity. If a greater amount of electricity is produced than used by the household, this extra can be exported to the national grid.

A PV cell is assessed on its peak power rating. This is tested by exposing the cell to the equivalent of full solar radiation and measuring the power output. The peak power is input into the Design SAP software as well as the physical attributes of the installation such as pitch, orientation and over-shading. A total energy saving per year can then be calculated through SAP for the PV installation. This is then offset against the electricity energy demand for the house.



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. Therefore, SHW systems are ideally utilised when the design of a dwelling already calls for a hot water cylinder, and not when a combination boiler is specified.

There are two main SHW systems: evacuated tubes and flat plate collectors. Evacuated tubes are more efficient at transferring solar irradiation to the fluid although flat plate collectors are considered to be better aesthetically and to install.



The final energy contribution to the household, calculated through SAP, is based on several factors:

- *Pitch, orientation, and over-shading*
- *Heat absorption efficiency for the collector*
- *Average hot water usage of the dwelling*

Most of the energy savings will be made in the hot water demand for the dwelling however, adding a SHW system will impact upon other energy demands.

Air Source Heat Pumps (ASHP)

ASHP provide heating and hot water to a home through thermal energy gathered from air outside the dwelling. Systems can be designed to work in conjunction with a boiler system but in the case of energy efficient new builds it is possible for an ASHP unit to provide 100% of the heating and hot water demand.

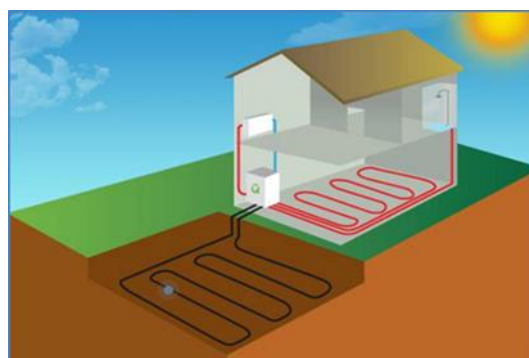
The thermal performance of the unit depends on the outside temperature as well as the unit's Coefficient of Performance. This is the ratio of thermal energy produced to energy used. A typical value for this would be around 3.5, meaning that for every 1kW of electricity consumed the unit would provide 3.5kW of thermal energy to the household. This efficiency leads to large carbon and energy savings for both space and water heating.



Ground Source Heat Pumps (GSHP)

GSHP provide heating and hot water to a dwelling through geothermal effects. A GSHP system would offset the energy demand from the main space heating. There is, however, an additional electricity demand for the pump and control system. This would reduce energy savings from the installation.

GSHP are expensive to install and rely on having appropriate ground conditions and suitable space around the dwelling for the pipe looping. Energy savings are dependent upon the type of system being replaced and the way the system is operated by the homeowner.



Biomass Heating Systems

Biomass heating systems burn fuels, considered carbon neutral, to heat the water required for a dwelling. There are a large variety of systems available, and choice depends on the type of fuel to be burned and the level of automation.



The system would offset the energy demand from the hot water and main space heating. However, biomass systems typically require a large amount of maintenance and monitoring.

The savings from such a system, in terms of CO₂ and money, depends upon what it is replacing. The savings are greatest when replacing an electrical hot water system but are considerably less for replacing mains gas.

Wind Turbines

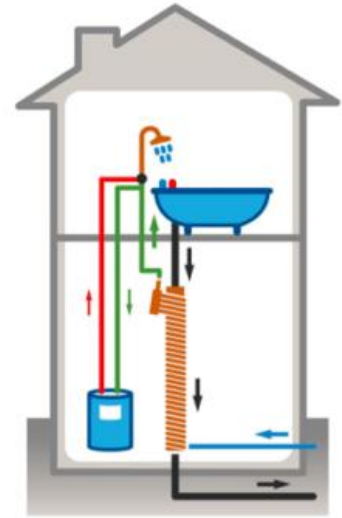
Wind turbines provide electricity directly to a dwelling. They can be added to a property in two ways: pole mounted or building mounted. The pole mounted systems are free standing and therefore require enough space around them to allow for the construction and maintenance of the structure, as well as to allow for efficient operation. The building mounted systems have a lower power output but do not require additional structures, as can be seen in figure

The energy produced from a wind turbine is heavily dependent upon the surrounding landscape. The energy saved will be offset against the electricity usage of the dwelling.



WWHRS

Waste water heat recovery system (WWHRS) recovers the energy that is lost from the waste water that is generated from showers. It uses a heat exchange system which recovers a portion of the energy that would normally be wasted. The waste heat is partially transferred to the incoming mains water inlet, which reduces the change in temperature required for the boiler to make. It therefore has the ability to reduce the amount energy required for the boiler to operate at specific points in the day.



FGHRS

Flue gas heat recovery system (FGHRS) works by recovering waste heat from the flue of a boiler. This waste heat is partially transferred to the main water inlet which raises the temperature of the water which is fed into the boiler. This reduces the amount of energy required to heat the boiler, as it reduces the temperature increase required for the boiler to operate, and therefore reduces the energy demand to heat the dwelling.

