

ENERGY STATEMENT

SHOWELL NURSERIES, CHIPPENHAM

JSP SUSTAINABILITY LTD
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EXECUTIVE SUMMARY

- The proposed development at Showell Nurseries includes construction of 120 no. residential properties by Taylor Wimpey.

- Taylor Wimpey proposes the construction of energy efficient homes capable of delivering reductions in energy consumption and CO_2 emissions over the minimum standards of the Building Regulations.

- Taylor Wimpey will implement a low carbon electric heating strategy for the development, delivering zero carbon ready homes. Each home will also benefit from a photovoltaic array.

1 INTRODUCTION

JSP Sustainability Ltd has been commissioned by Taylor Wimpey to prepare an Energy Statement to accompany the Reserved Matters planning application for the proposed residential development at Showell Nurseries, Showell, Chippenham. The application seeks approval for the design and construction of 120 no. homes, landscaping and associated highway works.

This Statement details the energy efficiency and renewable/low carbon energy strategy proposed by Taylor Wimpey to deliver significant reductions in CO_2 emissions above the Building Regulations Part L 2021 and a zero carbon ready development in advance of the introduction of the Future Homes Standard. A number of documents have been used to complete this report. These include;

National Planning Policy Framework (NPPF) includes a presumption in favour of sustainable development. The Framework expands upon the guiding principles and objectives of a successful planning system. These include the building of a strong and competitive economy, delivering high quality housing, requiring good design and meeting the challenges of climate change.

Approved Document L sets fabric efficiency standards and together with SAP, establishes a maximum CO_2 emission rate for new build residential properties. The Approved Document is the Government's sustainable design benchmark in England.

The Future Homes Standard: 2019 Consultation on changes to Part L and Part F of the Building Regulations for new dwellings. (January 2021) provides a summary of the received responses to the 2019 consultation and the Government's intentions to revise Part L of the Building Regulations in 2022 and introduce a FHS in 2025.

The Future Homes and Buildings Standards: 2023 Consultation was published in December 2023. Within the consultation the Government presented two options for the technical specification of the Future Homes Standard. Both options confirm a shift to low carbon electric heating.

Wiltshire Core Strategy includes Core Policy 41, Sustainable construction and low carbon energy. The policy requires new residential development to achieve the equivalent of Code for Sustainable Homes Level 4. The Code was suspended in 2015 and recent amendments to Part L of the Building Regulations outpace the equivalent 19% reduction in CO_2 emissions.

2 POLICY CONTEXT

2.1 Local Policy

Core Policy 14 of the Wiltshire Core Strategy requires;

"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...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."

2.2 Future Homes Standard

In January 2021 the Government responded to the public consultation on the Future Homes Standard (FHS) and proposed revisions to Part L. The Government confirmed;

"The introduction of the Future Homes Standard will ensure that an average home will produce at least 75% lower CO_2 emissions than one built to current energy efficiency requirements…Homes built under the Future Homes Standard will be "zero carbon ready", which means that in the longer term, no further retro-fit work for energy efficiency will be necessary to enable them to become zero carbon homes as the electricity grid continues to decarbonise."

"The Building Regulations will continue to set a performance based standard rather than mandating or banning the use of any technologies. However, to ensure that new homes are zero carbon ready, we intend to set the performance standard of the Future Homes Standard at a level which means that new homes will not be built with fossil fuel heating, such as natural gas."

"Currently electrification is one of the few proven scalable options for decarbonising heat. As set out in the consultation, we expect heat pumps will become the primary heating technology for new homes under the Future Homes Standard."

A consultation on the full technical specification for the FHS was launched in December 2023. Within the consultation the Government presented two options for the notional dwelling within the new Home Energy Model. However, both recipes include the specification of electric heat pumps with a co-efficient of performance greater than one.

Importantly the Government concluded that further improvements to fabric energy efficiency were not desirable or necessary;

The performance requirements in this consultation closely resemble the fabric standards in the 2021 Part L uplift to the Building Regulations. We investigated including better walls, floors, roofs, triple glazing and improved thermal bridging. However, the only cost effective and practical improvement we found could be made to the standard was an improvement in airtightness. This improvement in airtightness is matched with the change to a decentralised mechanical extract ventilation system, in line with Approved Document F, Volume 1: Dwellings.

The decision to keep fabric standards largely the same is driven by several factors. Firstly, the level set in 2021 will ensure that (with adequate ventilation) new homes do not generally experience damp and mould or excessive temperatures; an increase in fabric beyond this level does not give significant additional benefit. Secondly, it allows efficient low carbon heating, including modern heat pumps, to function well. The move to low carbon heating is central to the government's commitments to decarbonise housing, and so fabric must be set at a level that allows these systems to work efficiently. Again, increasing fabric beyond the proposed level does not deliver significant gains to the efficiency of heating systems. Thirdly, because the electricity grid is decarbonising rapidly, and the efficiency of heat pumps significantly reduces energy demand, further reducing total energy use is relatively less important than switching to electric sources of heat in efforts to decarbonise. Grid decarbonisation also means that fabric improvements are increasingly not a cost-effective intervention to reduce carbon. This means that as we increase fabric beyond the proposed level, the monetary value of carbon saved by increasing fabric efficiency is less than the cost of installing that additional fabric. As such, there are other interventions that decrease carbon and consumer bills in a more cost-effective way, such as (above) switching heat source and including solar PV panels."

Paragraph 4.2.3, Future Homes & Building Standard Consultation 2023

2.3 Local Energy Efficiency Standards Update

Following the publication of the Future Homes and Building Standard consultation in December 2023, the Minister for Housing published a written statement confirming;

"*The improvement in standards already in force, alongside the ones which are due in 2025, demonstrate the Government's commitment to ensuring new properties have a much lower impact on the environment in the future. In this context, the Government does not expect plan-makers to set local energy efficiency standards for buildings that go beyond current or planned building regulations. The proliferation of multiple, local standards by local authority area can add further costs to building new homes by adding complexity and undermining economies of scale. Any planning policies that propose local energy efficiency standards for buildings that go beyond*

current or planned buildings regulations should be rejected at examination if they do not have a well-reasoned and robustly costed rationale that ensures;

- *That development remains viable, and the impact on housing supply and affordability is considered in accordance with the National Planning Policy Framework;*
- *The additional requirement is expressed as a percentage uplift of a dwelling's Target Emission Rate (TER) calculated using a specified version of the Standard Assessment Procedure (SAP).*

Where plan policies go beyond current or planned building regulations, those policies should be applied flexibly to decisions on planning applications and appeals where the applicant can demonstrate that meeting the higher standards is not technically feasible, in relation to the availability of appropriate local energy infrastructure (for example adequate existing and planned grid connections) and access to adequate supply chains."

2.4 Part L of the Building Regulations

In anticipation of the FHS, the Government amended Part L of the Building Regulations on June 15th 2022 to deliver a saving of 31% in CO_2 emissions. The revisions are expected to provide the industry and supply chains with the incentive, skills and time to prepare for the FHS in 2025.

The Part L 2021 Regulations include improved u-value backstops, the inclusion of a new Primary Energy target, updated CO_2 emission factors to take account of the progressive decarbonisation of the national grid and the retention of the Fabric Energy Efficiency Standard. The formulation of the target recipe also makes it necessary to include renewable generation or low carbon heating to deliver compliance with the target metrics.

3 ENERGY STRATEGY

Taylor Wimpey will construct each home at the application site to a robust fabric and services specification capable of complying with the revised Fabric Energy Efficiency Standard. Furthermore, each home will be heated using modern low carbon air source heat pumps. Pursuing this electrified heating strategy in advance of the Future Homes Standard will allow each home to be labelled zero carbon ready at the point of first occupation. In addition to a low carbon electric heating strategy, each home will also be provided with a photovoltaic array which will generate free and zero carbon electricity for every household.

3.1 Energy Efficiency Measures

Taylor Wimpey's exposure to the marketplace has confirmed that purchasers demand energy efficient homes with low operating costs and technologies. As such the Group's current construction specification has been tailored to these demands and incorporates many of the lean and clean measures of the Energy Hierarchy. Listed below are some of the measures that will be incorporated into the detailed design of the scheme;

- The construction specification of every home will include high levels of insulation in the ground floor, external walls and roof spaces, capable of exceeding the minimum benchmarks of Part L and delivering compliance with the revised Fabric Energy Efficiency standard;
- Each house will be constructed using a traditional masonry method including the specification of an insulating aircrete block. This form of construction delivers thermal mass to the fabric of each home, which assists in the retention of beneficial heat but also aids in lowering the risk of summer overheating;
- The detailed house type designs will incorporate intelligent thermal bridging guidance, including the specification of thermally broken lintels, reducing a significant source of heat loss;
- The heating designs of each house type will include dual zone time and temperature controls with smart controls;
- Energy efficient lamps will be installed in every light fitting;
- Each property will be naturally ventilated using efficient decentralised continuous system 3 extract fans to ensure the internal living environment will be healthy and comfortable;
- High performance triple glazed units will be installed in every home; and

- Each entrance will be illuminated with an energy efficient external light or provision will be made for a purchaser to install such a fixture.

The table below provides a summary of the energy efficiency standards to be achieved in the design and construction of each new home;

Table 1 – Specification Summary

Element	Part L	Specification
Wall (houses)	0.26W/m^2K	0.18W/m^2K
Wall (flats)	0.26W/m^2K	0.20W/m^2K
Party Walls	0.20W/m^2K	0.00W/m^2K
Cold Roof	0.16W/m^2K	0.11W/m^2K
Floor	0.18W/m^2K	0.15W/m^2K
Glazing	1.60W/m^2K	0.86-1.10W/m^2K
Door	1.60W/m^2K	1.00W/m^2K
Air Permeability	8 m^3/(h.m^2) @ 50 Pa	4.50 m^3/(h.m^2) @ 50 Pa

The Government has concluded a consultation on the technical specification and the operation of transitional measures for the Future Homes Standard. A response is expected by the close of 2024. At the time of writing, it is not possible to forecast how many plots at the development site, if any, will be constructed post the implementation of the Standard. However, Taylor Wimpey will comply with any revised Regulations, and where necessary adhere to revised energy efficiency standards on plots that may start following the introduction of the Standard.

3.2 Waste Water Heat Recovery

The heating designs of each house will include the specification of waste water heat recovery. This technology, in the form of a heat exchange pipe connected to the shower drain pipe, recycles the heat from shower waste water to pre-heat the cold mains supply before it is brought to temperature by the main heating system. The technology lowers the energy demand of the home, delivering a saving in CO_2 emissions. SAP 10 modelling suggests the proposed provision will deliver a saving of 61,620.73kWh/year. This is equivalent to 19.64% of the site's forecasted hot water energy requirement.

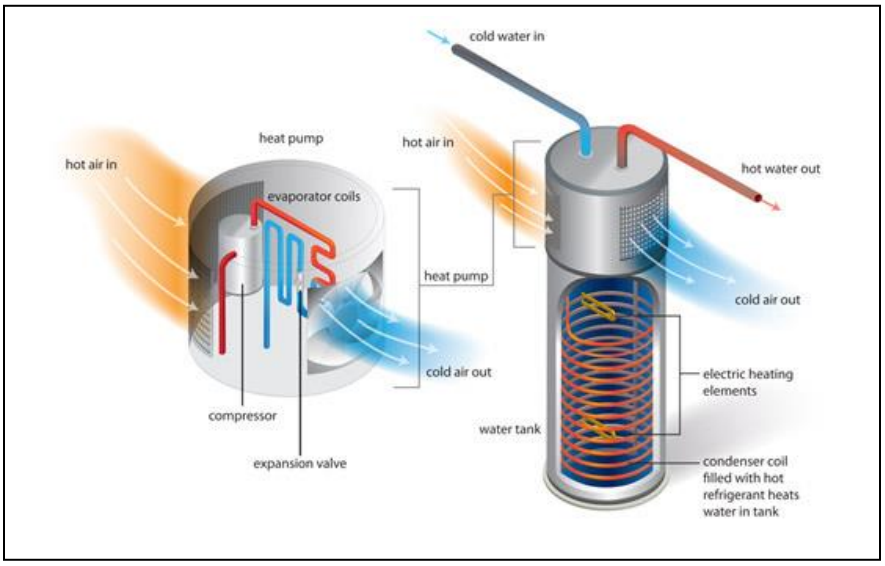
3.3 Air Source Heat Pumps

The services specification of every home will include low carbon heat pumps to provide 100% of each property's space heating and hot water requirement. The systems are highly efficient. Correctly designed, commissioned and installed systems operate coefficients of performance of

between 3 and 4. The systems are fed by mains electricity and their carbon reduction performance is expected to accelerate further as the national grid decarbonises. The technology has also been identified by the Climate Change Committee and the Government as the preferred solution to low carbon heating from 2025, when new connections to the gas grid are expected to stop.

Apartment blocks will benefit from an electrified heating and hot water strategy, incorporating heat pump hot water cylinders. The technology is a stand-alone hot water solution which utilises the ambient energy in the air of each apartment. The internal fan within the unit draws in the surrounding air, passing it through an evaporation coil filled with refrigerant, turning it into a vapour. This passes through a compressor, increasing its temperature. The vapour then passes through a hot water coil within the integral water tank to heat the domestic hot water supply.

Image – Hot Water Heat Pump



3.4 Photovoltaic Panels

Taylor Wimpey will provide each home and flat at the development with a photovoltaic array. The arrays will provide each home with a zero carbon and free source of electricity for consumption within the home, including for the installed air source heat pump, but also for export under the terms of the Smart Export Tariff. For the purposes of this assessment, we have assumed a standard 0.80kWp provision per property.

3.5 Reduced Energy Consumption

The table below details the site's forecasted emission rate and energy requirement.

Table 2 – Showell Nurseries Emission Rate

House Types	Regulated Energy Requirement (kWh/year)	Regulated Energy Consumption (kWh/year)	Target Emission Rate (kg/year)	Emission Rate (kg/year)
EMG44	15,019.60	6,496.92	2,712.53	828.36
EMA47	41,822.48	19,469.66	8,753.04	2,355.50
EMA44	73,842.21	29,485.82	15,533.70	3,434.10
H1457	5,710.04	2,282.60	1,299.86	265.36
EMT41	16,173.90	6,783.66	3,587.09	787.84
EMT31	88,526.88	45,345.78	18,774.72	5,331.31
EMA33	136,946.24	58,065.92	30,191.74	6,205.76
EMA22	7,823.42	3,016.80	1,688.04	296.02
EMAP41	4,754.29	2,059.75	1,015.99	230.47
EMAP32	42,986.90	22,664.70	9,344.64	2,571.66
EMAP22	78,750.40	33,242.80	17,788.36	3,416.52
Flats	38,802.33	22,962.11	8,356.01	2,656.34
Total	**551,158.69**	**251,875.52**	**119,045.71**	**28,379.24**

The calculations confirm that the site has a forecasted regulated energy requirement of 551,158.69kWh/year. The same calculations confirm a consumption forecast of 251,875.52kWh/year to meet this requirement. The difference is bridged by the renewable energy generated by the heat pump proposals. This is equivalent to 299,282.17kWh/year or 54.30% of the site's energy requirement.

In addition to the above, we have assumed a conservative 0.8kWp of PV provision to each home. Such a provision would generate 69,723.60kWh/year of electricity. This is equivalent to 27.68% of the sites consumption rate.

The calculations confirm a forecasted emission rate equivalent to a 76.16% saving over Part L 2021. This emission rate will lessen in sync with the decarbonisation of the National Grid.

4 EVALUATION

Taylor Wimpey is required by local policy included in the Wiltshire Core Strategy to deliver an energy efficient development. In response to the policy, recent amendments to the Building Regulations Part L and forthcoming changes associated with the Future Homes Standard, Taylor Wimpey has advanced a robust fabric specification which will achieve the required betterments over the Building Regulations and will provide each home with a zero carbon ready heating strategy. JSP Sustainability was instructed by the developer to review these proposals. We can confirm;

- The house type designs and build specification seeks to maximise passive solar gains to lessen the demand for space heating and artificial lighting;
- The fabric specification includes high levels of insulation to reduce heat loss and the space heating requirement of every home, delivering compliance with the revised Fabric Energy Efficiency standard;
- The lighting, heating and ventilation services of each home will consume energy efficiently;
- The heating designs of every house will include waste water heat recovery. This provision will shrink energy consumption associated with hot water by 19.64%;
- The development will pursue an electric heating strategy in advance of the introduction of the Future Homes Standard;
- Low carbon and highly efficient heat pumps will be included in the services design of every house and flat;
- The heat pumps are forecast to generate 54.30% of the site's regulated energy requirement;
- PV arrays will be provided to every home. The exact scale of provision will be determined at the detailed design stage, however even a minimum 2 panel provision has the potential to generate as much as 27.68% of the site's regulated consumption rate; and
- The site's emission rate will better the Building Regulations Part L by 76.16%. This emission rate will shrink in line with the decarbonisation of the National Grid.

In conclusion the strategy advanced by Taylor Wimpey will achieve savings in energy and CO_2 emissions and will deliver a significant portion of energy from low carbon and renewable energy. We recommend the approval of this Strategy by the local planning authority.