SUSTAINABILITY STATEMENT

Jack Lawson Terrace,

Wheatley Hill

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Revision	**Date**	**By**	**Comments**
-	08.02.24	JC	Initial Issue

INTRODUCTION

This statement has been prepared to support a planning application for the erection of 78 dwellings of Jack Lawson Terrace, Wheatley Hill.

1 DEVELOPMENT DESCRIPTION

1.1 The proposed development is located off Jack Lawson Terrace on the North Eastern end of Wheatley Hill in County Durham.

1.2 The proposals are for 78No. dwellings with a mix of 2, 3 and 4 bedroom dwellings, the proposed site layout for which is shown in Figure 1 below.

Figure 1 – Proposed Site Layout

2 PURPOSE OF THE STATEMENT

2.1 The statement will demonstrate that with a fabric first approach to energy efficiency, the proposed development will exceed the current Building Regulation standards in relation to the conservation of fuel and power and also consider other sustainable design considerations.

2.2 This is in response to paragraph 5.296 of policy 29 of the Local Plan for Durham County Council which states: *'The council has chosen to require higher standards and major new build residential development will be expected to achieve reductions in CO2 emissions of 10% below the Dwelling Emission Rate (DER) against the Target Emission Rate (TER) based on the 2013 edition of the 2010 Building Regulations (Part L).'*

3 SUSTAINABILITY STRATEGY

3.1 It is proposed that the dwellings will be constructed following a fabric first approach to exceed the current Building Regulations and utilising Air Source Heat Pumps to all dwellings. This will be achieved with high levels of insulation, modelled thermal bridging and low air leakage performance.

3.2 Other sustainability measures which are discussed within this statement include water use, impacts of materials, construction and household waste.

3.3 Decentralised energy schemes were investigated as part of the design process, see Section 6 'Decentralised energy', however due to factors outside of our control these have been discounted as viable options.

4 ENERGY CONSUMPTION

4.1 Energy demand of dwellings is a key factor when designing new homes and as part of a sustainability strategy for any new development. Building Regulations set out a minimum requirement for new dwellings in terms of energy performance through the use of a Standard Assessment Procedure (SAP) assessment.

Building Regulations

4.2 The proposed site will be constructed in accordance with the 2021 edition of Approved Document L1A (Part L), therefore this forms the baseline compliance level in terms of energy demand and CO2 emissions.

4.3 Section 1 relates to achieving a maximum calculated level of CO2 emissions, referred to as the 'Target Emission Rate' (TER). The TER is calculated in accordance with the Standard Assessment Procedure (SAP), which establishes a maximum rate - expressed in kilograms of carbon dioxide per metre squared of total useful floor area, per annum (kgCO2/m2/yr) – as the benchmark for compliance.

4.4 As shown in Table 1, the CO2 standards contained within Part L were increased in 2010 and 2013, reducing the TER by approximately 25% and a further 6% respectively, requiring substantial improvements to thermal insulation and heating services, or a significant increase in on-site renewable energy provision.

Building Regulations	CO2 emissions improvement over L1A 2006
L1A 2006	**-**
L1A 2010	**25%**
L1A 2013	**Circa 30%**
L1A 2021	**At least 31%**

Table 1. CO2 emissions improvements from Part L standards

Energy Strategy – Fabric First

4.5 A hierarchy of how to efficiently use energy has been long established by the Zero Carbon Hub and the Energy Savings Trust, this is shown in the Figure 2 below.

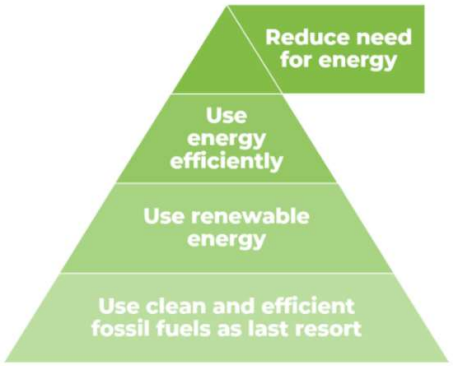

Figure 2 - The Energy Hierarchy

4.6 As demonstrated above, the first design principle to be applied is to reduce the need for energy. This done as a 'fabric first' principle by including high levels of insulation to improve U-values, reducing thermal bridging, improving airtightness and installing highly efficient heating systems. This allows future occupiers of the properties to further enhance the dwelling with additional measures such as bolt on renewable energy sources. The benefits of a fabric first approach are shown in Table 2 below.

	Fabric energy efficiency measures	**Bolt on renewable energy technologies**
Energy/CO2/fuel bill savings applied to all dwellings	✔	✗
Savings built-in for life of dwelling	✔	✗
Highly cost-effective	✔	✗
Increases thermal comfort	✔	✗
Potential to promote energy conservation	✔	✔
Minimal ongoing maintenance / replacement costs	✔	✗

Significant disruption to retrofit post occupation	✔	✗

Table 2. Benefits of the Fabric First Approach

Limits on Heat Gains and Losses

4.7 Section 4 of Part L outlines minimum standards specific building elements to ensure that an excessively low performance in one area is not simply offset through overperformance in another area.

4.8 To ensure that the energy demand of the development is reduced, the dwellings are designed to minimise heat loss through the fabric. Table 3 details the proposed specification of the dwellings in comparison with the minimum standards as required by Approved Document L1A.

	Part L1A Limiting Fabric Parameters	**Proposed Fabric Specification**
External wall – u-value	0.26 W/m2K	0.18 W/m2K
Party wall – u-value	0.20 W/m2K	0.00 W/m2K
Plane roof – u-value	0.16 W/m2K	0.10 W/m2K
Ground floor – u-value	0.18 W/m2K	0.14 W/m2K
Windows – u-value	1.6 W/m2K	1.14 W/m2K
Doors – u-value	1.6 W/m2K	1.14 W/m2K
Air permeability	8 m3/h.m2 at 50 Pa	5 m3/h.m2 at 50 Pa
Thermal Bridging	Y = 0.20 (default)	Circa 0.0.35

Table 3. Proposed construction specification – main elements

Energy efficient heating and lighting

4.9 Highly efficient air source heat pumps are proposed to all dwellings providing an efficient system, which has been assessed on a Gleeson Home by Sheffield Hallam University as being 293% efficient, and also removing the dependence on mains gas within the scheme. The ASHP will power a conventional heating system utilising radiators and all primary pipework will be fully insulated and controls including programmers, thermostats and thermostatic radiator valves will be installed in all dwellings.

4.10 Internal lighting is proposed to be 100% low energy fittings.

Passive design measures and overheating risk mitigation

4.11 The proposed site layout is designed around the existing site constraints including existing road connections, existing drainage, existing neighbouring properties, and site topography. However, orientation has been considered to maximise the potential for solar gain where possible.

4.12 Whilst solar gain in the winter is beneficial, reducing unwanted solar gain in the summer is equally important to manage overheating. Natural ventilation through window openings will allow sufficient air exchange rates to purge any heat build-up and trickle ventilation will provide continuous background ventilation to all properties.

Building Performance Consistent with DER

4.13 Ensuring the built form is representative of the design calculations has been a discussion point for a number of years. 'The performance gap', as it has been referred, has been closed in the most recent versions of SAP software using a number of tools. The main issues which have been dealt with are Thermal Bridging, heat loss through construction elements particularly important at junctions between elements and Air Leakage, heat losses through air pathways causing draughts.

4.14 This has been addressed in 2021 building regulations through the requirement for documentation to be provided to the energy assessor to ensure critical details are constructed correctly. This requires the personnel responsible for the construction of the dwellings to take photographs of pre-determined construction details which must be geo-located and time stamped to be approved by the energy assessor prior to construction commencing past that stage. Gleeson have adopted the use of Zutec quality management software across the business to ensure compliance with these regulations.

Provisions for Energy-Efficient Operation of the Dwelling

4.14 The occupant of the dwelling should be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services. This is particularly important with the introduction of Air Source Heat Pumps in the development as this will be unfamiliar technology to most occupants.

4.15 As outlined above, all dwellings are designed with Air Source Heat Pumps serving traditional heating systems, fully insulated primary pipework, controls including programmers, thermostats

and thermostatic radiator valves to avoid unnecessary heating of spaces when not required. With high levels of insulation exceeding the requirements of current building regulations, the dwellings have been designed to reduce the need for energy and use what energy is required efficiently and therefore taking the first 2 steps in accordance with the energy hierarchy.

4.16 To demonstrate the above, SAP calculations have been undertaken on each of the proposed dwelling types to outline the as-designed CO2 emissions, in comparison with Building Regulations standards. The results of these calculations are shown in Table 4 with the improvement achieved at design stage.

House Type	TER (kWh_{pe}/m2)	DER(kWh_{pe}/m2)	% Improvement
250	61.3	38.94	36.48%
254	59.04	44.28	25%
350	57.03	36.72	35.61%
353	63.69	40.41	36.55%
354	62.95	41.51	34.06%
355	58.22	41.06	29.47%
359	63.47	40.58	36.06%
360	60.54	39.16	35.32%
450	55.73	36.95	33.7%
454	57.84	38.75	33%

Table 4. As-designed Dwelling Performance – CO2 emissions

4.17 The estimated site-wide Part L compliant and as-designed CO2 emissions are shown in the table 5 below.

	TER (kWh_{pe}/m2)	DER (kWh_{pe}/m2)	% Improvement
Site Wide Emissions	4632.3	3070.6	33.70%

Table 5. As-designed site-wide performance - CO2 emission

5 RESOURCE EFFICIENCY

5.1 This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development.

Materials

5.2 The impacts of construction materials is far reaching from the source of the material, the carbon embodied within its manufacture through to transportation, life cycle and end of life use. Gleeson

have a policy to ensure all procurement is done with sustainability at its heart and where materials can be ethically sourced a preference will be given to materials that:

1. Have increased recycled content
2. Minimise ecological damage
3. Have low embodied carbon or have carbon off-setting policies in place
4. Utilise less material by design
5. Can be easily recycled
6. Minimise packaging waste
7. Minimise use of water

Waste

5.3 Sending waste to landfill has various environmental impacts, such as the release of local pollution, ecological degradation and methane emissions, in addition to exacerbating resource depletion. Gleeson currently divert 96% of waste generated on our sites away from landfill and we are continuously looking for ways to improve on this through our sustainable waste management policy.

Water Conservation

5.4 In accordance with Approved Document G of the building regulations, 'reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiently for the prevention of undue consumption of water'.

5.5 The building control requirement is to ensure a maximum usage of 125 litres of water per person per day. Table 6 and 7 below illustrates the water consumption for the house types proposed on the development.

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
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	7.70
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	4.00	1.58	1.58	7.90
Bath (where shower also present)	Capacity to overflow(litres)	140.00	0.11	0.00	15.40
Shower (where bath also present)	Flow Rate(litres / minute)	5.50	4.37	0.00	24.04
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)	6.00	0.44	10.36	13.00
Washing Machine	(Litres/kg dry load)	8.17	2.1	0.00	17.16
Dishwasher	(Litres/place setting)	1.25	3.6	0.00	4.50
Waste disposal unit	(Litres/use)	☐ Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	Total Calculated use (litres/person/day) =SUM(column 4)			95.54
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			86.94
	(10)	External water use			5.0
	(11)	Total water consumption (Building Regulation 17.K) =(9)+(10)(litres/person/day)			91.9

Table 6. Water Calculator for 2 or 3 bedroom properties

Installation Type	Unit of Measure	Capacity/Flow rate (1)	Use Factor (2)	Fixed use (litres/person/day) (3)	Litres/person/day = [(1)x(2)] + (3) (4)
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	7.70
WC (multiple fittings)	Average effective flushing Volume (litres)		4.42	0.00	0
Taps (excluding kitchen/utility room taps)	Flow rate (litres/min)	5.60	1.58	1.58	10.43
Bath (where shower also present)	Capacity to overflow(litres)	140.00	0.11	0.00	15.40
Shower (where bath also present)	Flow Rate(litres / minute)	6.00	4.37	0.00	26.22
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)	6.00	0.44	10.36	13.00
Washing Machine	(Litres/kg dry load)	8.17	2.1	0.00	17.16
Dishwasher	(Litres/place setting)	1.25	3.6	0.00	4.50
Waste disposal unit	(Litres/use)	☐ Present	3.08	0.00	0
Water Softener	(Litres/person/day)		1.00	0.00	0
	(5)	Total Calculated use (litres/person/day) =SUM(column 4)			100.25
	(6)	Contribution from greywater (litres/person/day)			0
	(7)	Contribution from rainwater (litres/person/day)			0
	(8)	Normalisation factor			0.91
	(9)	Total internal water consumption = [(5)-(6)-(7)]x(8) (litres/person/day)			91.23
	(10)	External water use			5.0
	(11)	Total water consumption (Building Regulation 17.K) =(9)+(10)(litres/person/day)			96.2

Table 6. Water Calculator for 3 or 4 bedroom properties

5.6 This demonstrates the water usage in the proposed dwellings achieves 91.9 litres of water usage per person per day in 2-3 bedroom properties and 96.2 litres of water usage per person per day in 3-4 bedroom properties, exceeding the requirement of the building regulations.

6 CONSTRUCTION PHASE ENERGY USE

6.1 As a business, Gleeson has committed to reducing energy usage in the construction of its homes. We have committed to reducing our Scope 1 and 2 emissions to 1.75tCO2e by 2023 from our current emissions of 1.86tCO2e.

6.2 This is being achieved through a number of measures. Forklift trucks on all of our development sites have been replaced with more energy efficient models reducing emissions from this plant alone by 8%. This has generated a saving of 144 tonnes of CO2e in 2022.

6.3 We are trialling the use of hydro-treated vegetable oil (HVO) fuel as an alternative to diesel on our development sites which has saved 143 tonnes of CO2e versus regular diesel, a 93% saving. An instruction group wide has been implemented to use HVO fuel where available at a reasonable price and this continues to be monitored.

6.4 Generator usage, using diesel to power our on-site temporary facilities has been reduced through better planning of our sales and build activities. This has resulted in a 26% reduction in CO2e over the past 2 years.

6.5 Reflective of Section 5, Resource Efficiency, 99.9% of the timber we use in construction is from an FSC or PEFC certified source. Our sustainable waste policy has helped divert 99% of construction waste we generated away from landfill either being recycled or converted to energy.

7 DECENTRALISED ENERGY

7.1 Durham County Council has corporate priorities to reduce carbon dioxide emissions by 55% by 2030. The Durham District Energy Study comprises of two phases. The study was funded by the Heat Network Delivery Unit with their aim being to identify opportunities for the development of district energy networks in Durham. Phase 1 scoped the potential for district heating/cooling across the city where phase 2 included detailed feasibility and financial modelling of the opportunities at hand.

7.2 The methodology and approach to Phase 1 and 2 demonstrated learning opportunities by rigorously evaluating several energy options including some bespoke to Durham City (e.g. river source heat pumps). Sustainable heat provision and retrofit of heat networks in urban areas presents a huge challenge/opportunity for most regions.

7.3 The development of a decentralised energy scheme to solely service this development would incur a high initial expenditure that would make the development unviable.

8 SUSTAINABLE TRANSPORT

8.1 The proposed site layout offers good access arrangements for pedestrians and cyclists and links through the estate, reflecting principles of Manual for Streets, and to the wider local highway network.

8.2 Multiple access points are available from the development to create the most direct walking routes to bus stops and the surrounding amenities. The main amenities and facilities lie within Wingate Lane to the South of the site and there are a variety of employment opportunities within the surrounding villages and towns such as Thornley, Shotton Colliery and Peterlee.

8.3 Within 2km of the site, a generally acceptable walking distance, facilities such as public houses, Primary School & Nursery, General Stores, Churches and a community centre can be accessed. In addition to this a further amenities are accessible to cyclists within 5km.

8.4 Sustainable transport use is encouraged to residents. EV charging points are also proposed for all dwellings. Therefore, with these in place and the amenities and facilities available within the local area it is considered that the site promotes sustainable transport throughout.

9 CONCLUSIONS

9.1 A strategy for a fabric first approach has been developed in relation to the development to ensure the energy need for the dwellings is reduced as much as possible and that any energy which is used in the running of the development is done so efficiently.

9.2 Using a range of measures including high levels of insulation, efficient building services, a reduction in thermal bridging and unwanted air leakage paths, the information contained above

demonstrates that the proposed dwellings are exceeding current building regulation requirements and as such meet the objectives of the sustainability strategy discussed in Section 3.

9.3 The energy use in construction has been minimised through a number of initiatives to ensure a reduction in CO2 during the construction phase.

9.4 Calculations undertaken on the proposed dwellings using SAP demonstrate that through following the energy efficiency approach described, the calculated as-designed emissions are reduced by 33.4 % over Part L 2021 requirements.

9.5 It has been determined that the calculated water consumption would equate to a maximum water consumption of 91.9 litres of water usage per person per day in 2-3 bedroom properties and 96.2 litres of water usage per person per day in 3-4 bedroom properties, and therefore offer a significant improvement on the maximum of 125 litres/person/day allowable by Approved Document G.

9.6 Sustainable travel has been considered as part of the development and demonstrated that the scheme provides opportunities for cycling and walking along with proposals to encourage sustainable travel.

9.7 The future occupants are responsible for the future energy use of the dwelling, for which the developer can only advise at the point of sale through the use of Home User Guides and Home Demonstrations. However, the developer cannot legislate for the use of the dwelling once sold.

9.8 Overall, the scheme demonstrates a sustainable approach to development through construction and in the built form and shows compliance with best practice guidelines and local policies.