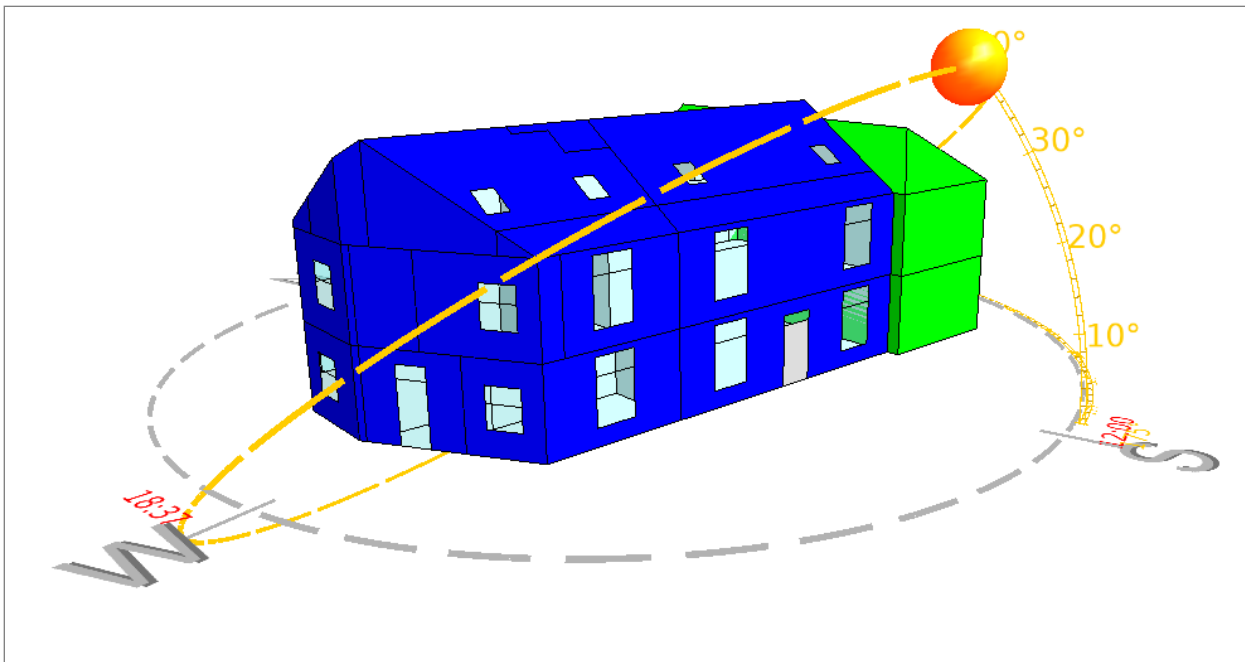




Energy & Carbon Statement

1 Ferngrove House,
Rochdale Old Road,
Bury
BL9 7LS

25th April 2024

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Document Status

Client: -- Mr S.Owen of Woodtop Estates Ltd

Site: -- 1 Ferngrove House

Proposals: -- HMO Extension

Contents:

1	Executive Summary	3
2	Introduction	5
2.1	Project Scope	5
2.2	Development Description	5
2.3	Site Location.....	6
3	Policy Context.....	7
3.1	National Policy Context – National Planning Policy Framework (December 2023)	7
3.2	National Policy Context – Local Policy (Places for Everyone (PfE) - Greater Manchester districts).....	7
4	Design Criteria	9
4.1	Review and implement the Energy Hierarchy: Be Lean, Be Clean, Be Green.....	9
4.2	Be Lean – Use Less Energy	9
4.3	Be Clean – Supply Energy Efficiently.....	10
4.4	Be Green – Use Less Energy.....	10
5	Summary of Results.....	11
6	Conclusion	12

Appendices:

Appendix A: Sustainability matrix of Be Green technologies

Appendix B: Local district and site-wide heat networks

Appendix C: BREEAM Ene 01 Credits

Appendix D: Be Lean BRUKL (attached separately)

Appendix E: Be Clean BRUKL (attached separately)

Appendix F: Be Green BRUKL (attached separately)

Document Control Record:

Prepared by	Checked by	Date	Job	Revision
Ben Dibb-Fuller	-	25.04.24	-	-

1 Executive Summary

An energy and carbon statement has been carried out for the proposed extension to the property at the site of 1 Ferngrove House on Rochdale Old Road in Bury, greater Manchester.

The existing property is currently used as a HMO, housing seven bedrooms over three floors – with the proposed works intending to extend the property on the space created by the removal of the existing vacant garage. The proposed extension intends to create an additional six ensuite bedrooms, two communal kitchen/dining/lounge areas and a utility/laundry space.

The structure and philosophy of the report has been based upon utilising best practice methodology and adheres to the “Be Lean, Be Clean and Be Green” hierarchy as follows:

Energy Efficient Measures (Be Lean – Use Less Energy)

To maximise the energy efficiency of the development and reduce the energy demand, the development will benefit from the following:

- High specification building fabric
- U values that improve on Part L2 standard values
- Low air leakage rates

Energy Efficient Systems (Be Clean – Supply Energy Efficiently)

- Dedicated LED low energy efficient light fittings within all areas
- Heating & Hot Water provided via high efficiency systems

Renewable Technologies (Be Green – Use Renewable Energy)

The following renewable technologies have been evaluated as part of this report:

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

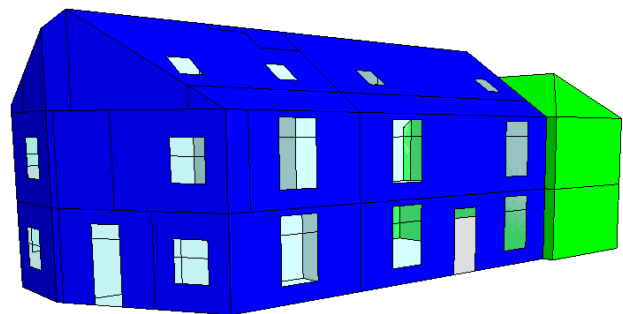


Figure 01.- *Street view of existing property (Left) and IES model of the proposed development (right)*

It can be concluded the content of this report highlights that the scheme is on course to comply with relevant national and local policy (Places for Everyone (PfE) - Greater Manchester districts) – which the latter states (paraphrased):

- (a) Be net zero carbon which applies to regulated operational carbon emissions;*
- (b). Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;*
- (c). Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;*
- (d). In residential developments, achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation, in accordance with Table 5.1.*
- (e). For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.*
- (f). Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets*

From the SBEM calculations, the results of which as shown in this report, demonstrate that the scheme is on track to secure an improvement in carbon emissions utilising Approved Document Part L2B 2021 as a baseline.

Energy Heirachy Stage	Regulated Non-residential Carbon Dioxide Savings (kgCO ₂ / m ² / annum)	Percentage improvement on Part L2A
Baseline	7.41	-
Be Lean	6.15	17.0%
Be Clean	5.42	26.8%
Be Green	0.00	100%
Site-wide percentage improvement on L2A 2021		100%

The client will use the best endeavours to incorporate the proposed measures to achieve an operational net zero carbon building / project. However, all renewable and low/zero carbon measures are to be reviewed at the time of construction and are subject to financial budget(s) and practical feasibility where the strategy may be revised.

2 Introduction

2.1 Project Scope

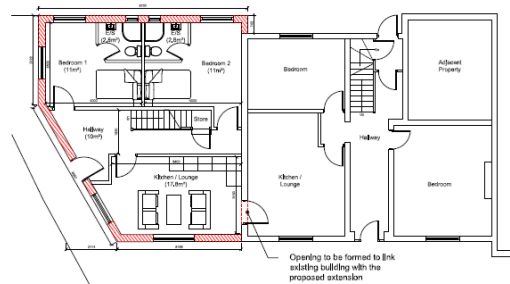
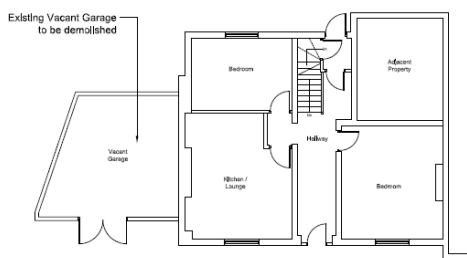
This Energy & Carbon Statement report has been prepared to assist with the planning submission for the site.

The purpose of this energy and statement is to model the proposed development, utilising SBEM software, identify the baseline carbon emissions; then utilise the energy hierarchy to minimise energy usage and carbon emissions, thus ensuring compliance with both national and local policy.

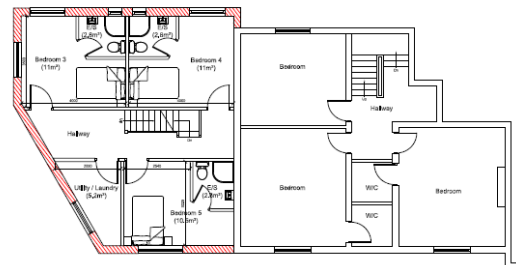
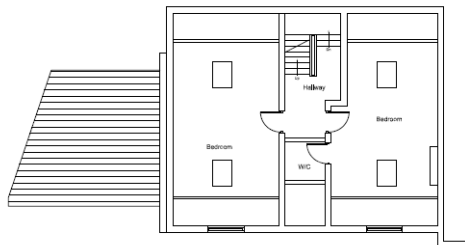
2.2 Development Description

The proposed site in question the property at the 1 Ferngrove House, currently in use as a seven-bed HMO with a single kitchen/dining/living space.

This report focuses solely on the proposed extension to this property, which entails a proposed six-bed (all ensuite rooms) HMO spanning three floors. Communal kitchen/dining/lounge spaces are proposed for the ground and third floors, in addition to a laundry/utility space. Eight new parking spaces are to be created at the site development, including the incorporation of an adequate number of electric vehicle (EV) charging points in line with Approved Document S.

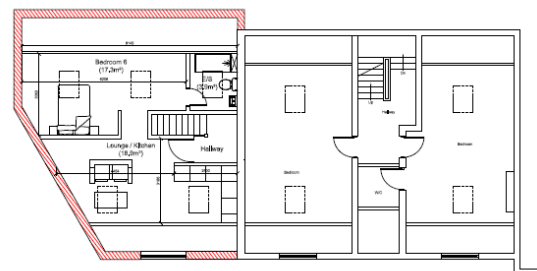
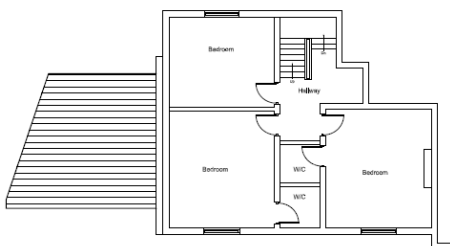


02 PROPOSED GROUND FLOOR PLAN
Scale 1:100 @ A1



03 EXISTING FIRST FLOOR PLAN
Scale 1:100 @ A1

03 PROPOSED FIRST FLOOR PLAN
Scale 1:100 @ A1



04 EXISTING SECOND FLOOR PLAN
Scale 1:100 @ A1

04 PROPOSED SECOND FLOOR PLAN
Scale 1:100 @ A1

Figure 03.- Existing and Proposed GA Floor Plans

2.3 Site Location

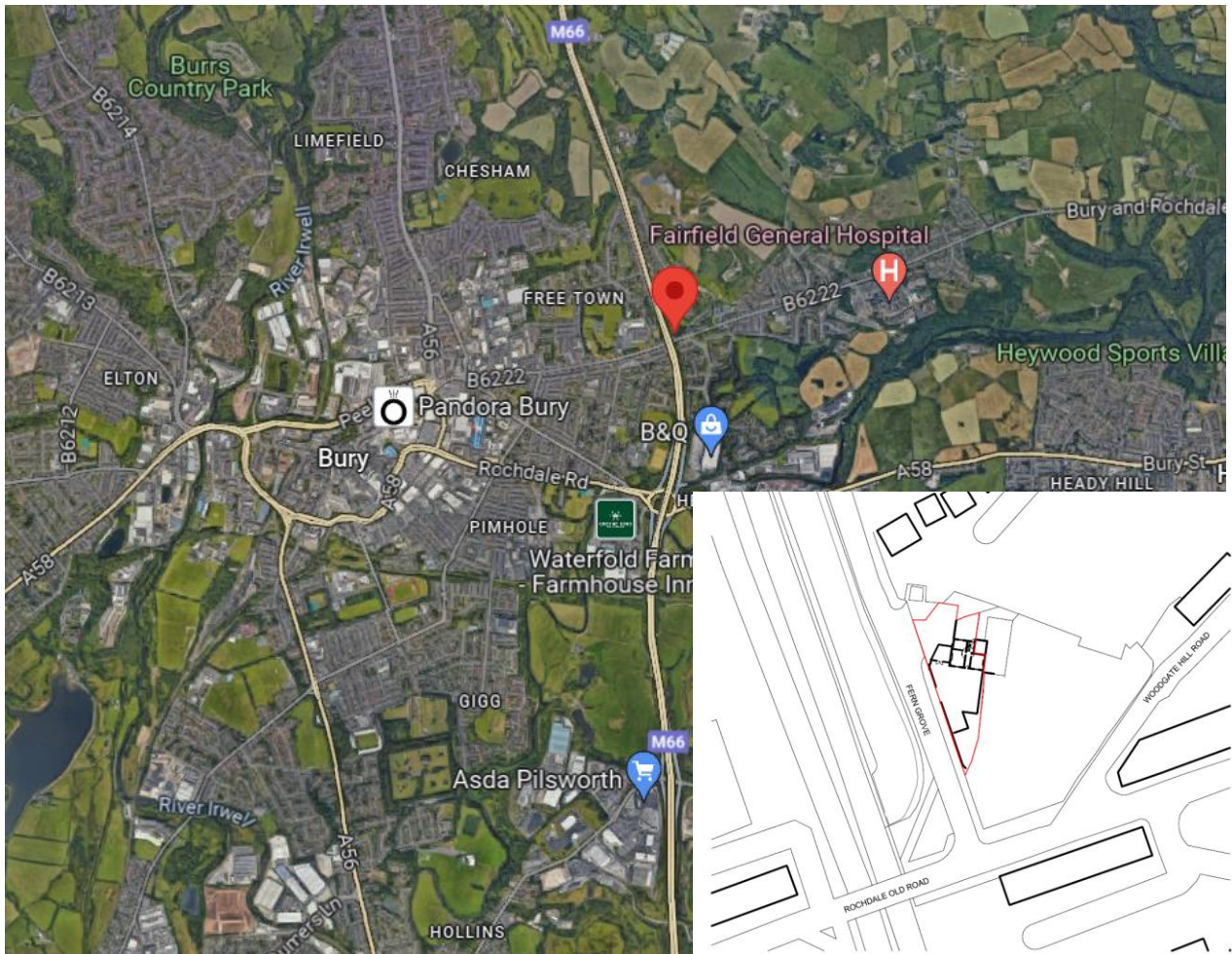


Figure 04.- Location plan of development

3 Policy Context

Within this section of the report we will review both local and national policy, establishing key principles that can be taken forward and applied across the development.

3.1 National Policy Context – National Planning Policy Framework (December 2023)

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a) an economic objective – *to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;*

b) a social objective – *to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being.*

c) an environmental objective – *to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*

3.2 National Policy Context – Local Policy (Places for Everyone (PfE) - Greater Manchester districts)

JP-S2: Carbon and Energy

The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

- 1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;*
- 2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;*
- 3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;*
- 4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;*
- 5. An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;*

(a) Be net zero carbon which applies:

- from adoption– to regulated operational carbon emissions;*
- from 2028 - to all emissions 'in construction'.*

From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions.

Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:

- i. Minimise energy demand;*
- ii. Maximise energy efficiency;*
- iii. Use renewable energy;*
- iv. Use low carbon energy; and*
- v. Utilise other energy sources.*

From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.

As an interim measure, development should be consistent with the 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

(b). Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

(c). Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;

(d). In residential developments, achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation, in accordance with Table 5.1.

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

(e). For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.

(f). Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

Districts may set out specific carbon emission reduction and energy demand targets within Local Plans. However, Bury to date has not set any specific targets beyond the above measures.*

4 Design Criteria

Within this section of the report we will, utilising SBEM software, carry out an assessment of the proposed development against current Building Regulations. We will establish CO₂ baseline, then following the energy hierarchy, establish a low-carbon specification to ensure CO₂ emissions meet the requirements of both national and local policy.

Full SBEM calculations will be carried out at detailed design to ensure the specification meets the local policy. If any amendments to the design are required these will be incorporated at this point and calculations updated to ensure compliance.

4.1 Review and implement the Energy Hierarchy: Be Lean, Be Clean, Be Green

The Energy Hierarchy is a classification of energy options, prioritised to assist progress towards a more sustainable energy system. The energy hierarchy uses a step-by-step process:

- Step 1 Be lean – Use less energy.
- Step 2 Be Clean – Use energy efficiently
- Step 3 Be Green – Utilise renewable technology.

4.2 Be Lean – Use Less Energy

The developer, in accordance with both national and local planning policy, has stated their wish towards ensuring the development follows a fabric first approach, therefore reducing demand on the national grid as reasonably possible.

Below we have highlighted the As-Built U values, going beyond the requirements of Building Regulations; thus improving upon the baseline CO₂ emissions. A glazing g value of 50% has been proposed to help reduce the overheating risk to the property.

Table 01.- Be Lean - Summary of Proposed Building Fabric U-Values

Building Element	Proposed Building Fabric U Value (W/m ² .K)	Minimum Fabric Efficiency (Part L2A 2013) (W/m ² K)
Ground Floor	0.15	0.18
External Wall	0.18	0.26
Roof	0.15	0.18
Windows and Roof Lights	1.20	1.60
Windows and Roof Light g value	50%	-
External Doors	1.20	1.60
Air Permeability	3	8

4.3 Be Clean – Supply Energy Efficiently

Within this section of the energy hierarchy, we see an emphasis being placed upon ensuring the regulated energy demands of the development are met as efficiently as possible.

District and site-wide heat networks can be utilised to provide heating and hot water to a development in an efficient manner. In this instance there isn't a district wide network within the vicinity of the scheme (see appendix B).

Furthermore, in many cases we also see opportunities to include a combined heat and power system (CHP), which allows for the production of electricity. Although the scheme will provide a mix of users which could allow for a site side heat network and CHP, The development programme, size of the development, and uses are not aligned in a way to allow for CHP to be considered.

The next stage is to look at possible be clean measures that can be introduced to individual plots on site. Below we have identified the practical measures to be introduced:

Table 02.- Be Clean – Summary of proposed Be Clean measures

Heating & Hot Water provided via high efficiency systems
100% LED lighting - 95lm/W

4.4 Be Green – Use Less Energy

The final phase of the report is to ascertain if the development will benefit from renewable/low carbon technologies and the following renewable/low carbon technologies will be analysed for this development;

- Solar Thermal
- Solar PV
- CHP
- Air Source Heat Pump
- Ground Source Heat Pump

See appendix A for detailed summary of the sustainability matrix of Be Green technologies.

Renewable technology in the form air source heat pumps for space heating/domestic hot water production and roof mounted solar PV have been selected as the best fit renewable technologies for the site.

Table 03.- Be Green – Summary of proposed Be Green measures

We have reviewed the renewable options available to this site and have included the following: • Air Source Heat Pump to provide spacing heating and domestic hot water production • Roof-mounted solar PV to provide on-site electrical energy production, an indicative sized array of 35m² has been proposed – which is currently required to generate 5.36MWh of on-site

5 Summary of Results

Table 4 summarises the performance of the development using the guidance outlined in Part L2A for new buildings respectively as the baseline target.

It can be concluded that CO₂ emissions of predicted energy use of the development will be reduced under Part L2A 2021 through the efficient supply of energy (demonstrated in Be Clean) and the utilisation of less energy (demonstrated in Be Green), with the development evidenced to being;

- 1) Net zero carbon from regulated operational carbon emissions;
- 2) Complaint with current (2021) Building Regulations (see BRUKL's attached) and;
- 3) Achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions category (see Appendix C).

Table 04.- Summary of Results using the Energy Heirarchy

Energy Heirachy Stage	Regulated Non-residential Carbon Dioxide Savings (kgCO ₂ / m ² / annum)	Percentage improvement on Part L2A
Baseline	7.41	-
Be Lean	6.15	17.0%
Be Clean	5.42	26.8%
Be Green	0.00	100%
Site-wide percentage improvement on L2A 2021		100%

6 Conclusion

This report is based upon a review of the proposals and a thorough analysis of relevant national and local planning policy requirements. Both the National Planning Policy Framework 2021 and Local Plan (Places for Everyone (PfE) - Greater Manchester districts).

The Places for Everyone (PfE) - Greater Manchester districts - policy requires new developments to achieve net zero carbon in regulated operational carbon emissions. In addition, compliance with 2021 building regulations and score at least and EXCELLENT standard for the 'Ene 01 – reduction of energy use and carbon emissions category.

The development will follow the Be Lean, Be Clean, Be Green Energy Hierarchy to demonstrate this:

Energy Efficient Measures (Be Lean – Use Less Energy)

To maximise the energy efficiency of the development and reduce the energy demand, the development will upgrade any thermal elements that fall outside the minimum threshold as set out in Table 4.2 of the as Building Regulations *Volume 2: Buildings other than dwellings*. Due to the age of the existing build (2004), it is assumed than no existing thermal elements will be required to be upgraded.

Energy Efficient Measures (Be Clean – Supply Energy Efficiently)

The developments will utilise electric as a primary fuel for heating and hot water where possible and will be provided with a high level of user control including local and central temperature controls.

Dedicated LED low energy efficient light fittings within all areas.

Renewable Technologies (Be Green – Use Renewable Energy)

All The following renewable technologies have been evaluated as part of this report;

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

It can be concluded the content of this report highlights, via SBEM calculations, the scheme is on track to secure a net zero in operational carbon emissions, utilising Approved Document Part L2A 2021 as a baseline.

The site is therefore on track to be compliant with both the National Planning Policy Framework 2021 The Places for Everyone (PfE) - Greater Manchester districts Local policy.

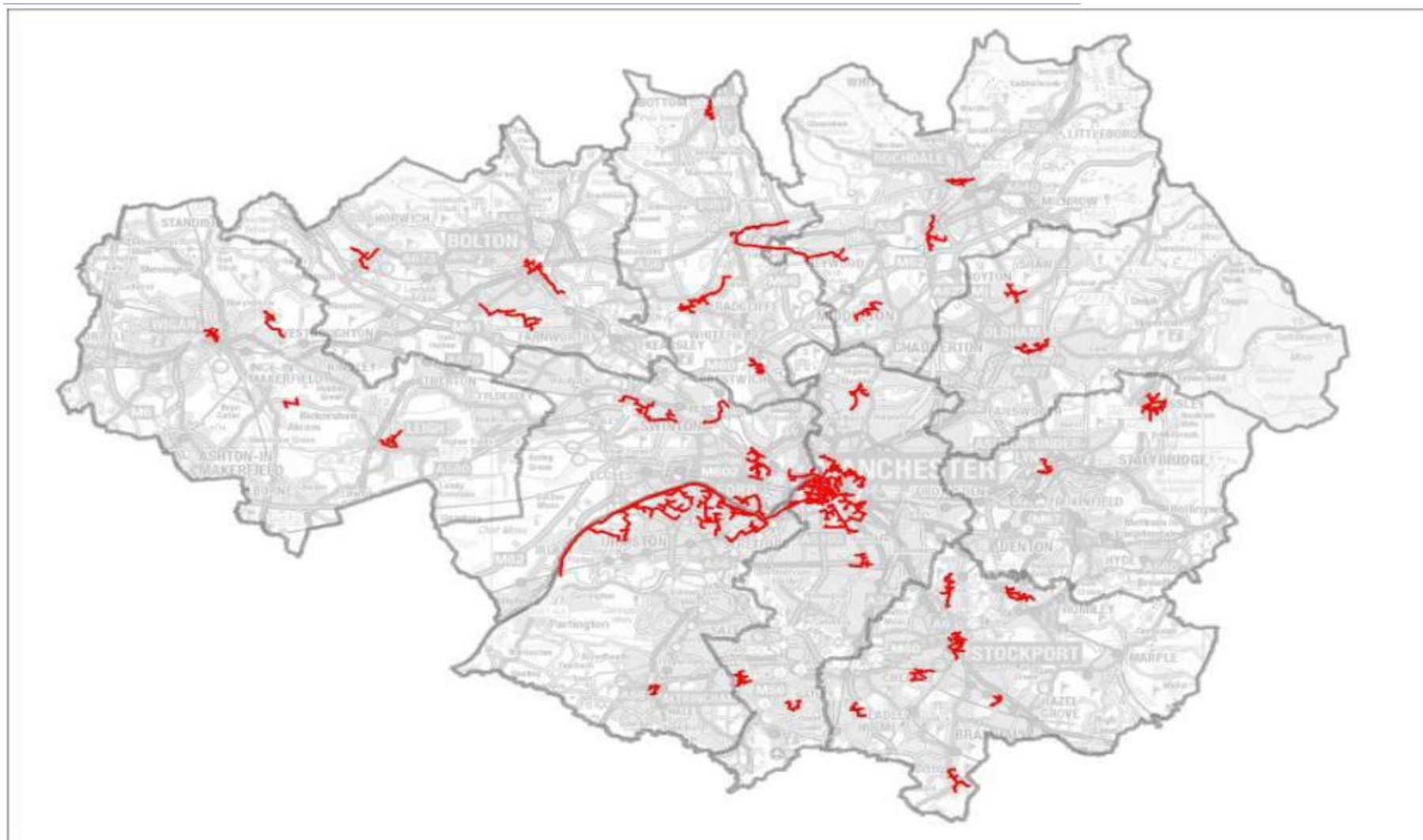
The client will use the best endeavours to incorporate the proposed measures to achieve an operational net zero carbon building / project. However, all renewable and low/zero carbon measures are to be reviewed at the time of construction and are subject to financial budget(s) and practical feasibility where the strategy may be revised.

Appendix A: Sustainability matrix of Be Green technologies

Technology	Description	Pros	Cons	Project Suitability	Included in Proposed Scheme?
Solar Thermal	Solar thermal hot water collectors are panels or evacuated tubes which are typically located on the roof of the buildings. The collectors harness the sun's energy to warm domestic hot water	- Reduced fuel bills and carbon footprint - Low maintenance - Proven technology	- Only compatible with boilers that have hot water storage - Need south facing roofs to optimise efficiency - Carbon saved is low comparative to the savings offered by PV	Solar thermal HW is not deemed suitable for this development due to the nature of the scheme in particular the level of hot water demand thus making the suitability of a system unfeasible.	
Solar PV	Solar Photovoltaic (PV) panels work by converting energy from the sun into electricity. This can then be used with the development to offset the electrical usage.	- Reduced bills and carbon footprint - Benefit from the feed in tariff - Proven technology - Relatively maintenance free	PV panels lose efficiency over their lifetime	PV would be suited to this development as it is a simple bolt on technology that will assist with meeting the energy demand of the building and ensure compliance with the local planning policy. However, the scheme would benefit more with the use of an air source heat pump.	
Combined Heat & Power (CHP)	CHP is a technology which develops heat and power from the same energy source, typically mains gas. The CHP engine is fed by mains gas which then drives an alternator to provide electricity. CHP is highly energy efficient as the heat and electricity are produced on site, therefore reducing transmission losses. Typical efficiencies are 50% for the heat and 35% for the electric.	- Reduced fuel bills and carbon footprints - Eligible for the feed in tariff. - Proven technology which is in use in many schemes in the UK - Suited to large developments	- Not a true renewable technology - Heating and electricity demand must remain fairly stable to ensure CHP is running at optimum efficiency - Requires a centralised/district heating network - Noise. / Capital intensive	The total size and nature of the development does not lend itself to CHP. It would add to the capital costs of the development making the development not financially viable. For these reasons, CHP has been discounted	

Technology	Description	Pros	Cons	Project Suitability	Included in Proposed Scheme?
Air Source Heat Pump	Air source heat pumps extract heat from the external air which can be used to heat radiators/underfloor heating and hot water within a dwelling. ASHP can still extract heat from air as cold as -15 degrees centigrade. ASHP are particularly useful on sites where gas is not available. There are two forms of ASHP – air to air and air to water.	• Can offer lower heating bills and reduce carbon footprints (when compared to electric systems) • Relatively maintenance free • Offers high efficiencies • Can offer heating and cooling depending on system chosen (air to air)	• Requires space to locate the external condenser unit. The unit requires lots of space around it to ensure adequate air flow. • Requires the use of underfloor heating or large radiators due to low grade heat. • Noise issues	Air source heat pumps have been included on this development due to the lower emissions associated with this technology.	
Ground Source Heat Pump	Ground source heat pumps (GSHP) work in a similar way to air source heat pumps, however they extract heat from the ground. A ground loop is buried within the garden and a mixture of water and refrigerant is circulated along the loop. The heat from the ground is then absorbed within the fluid and then passes through a heat exchanger within the GSHP. Ground loops can be laid horizontally at depths of 1-2m or vertically at depths of up to 100m.	• Can offer lower heating bills and reduce carbon footprints (when compared to electric systems). • Relatively maintenance free • Offers high efficiencies	• High capital costs • Requires space for boreholes or trenches to locate ground loops • Requires the use of under floor heating or large radiators due to low grade heat	Ground source heat pumps have been discounted on this development predominantly due to the nature of the development and the lower emissions associated with an air source heat pump.	

Appendix B: Local district and site-wide heat networks



Appendix C: BREEAM Ene 01 Credits

Ene 01 Energy efficiency

No. of BREEAM credits available		12	Available contribution to overall score		10.36%
No. of BREEAM innovation credits available		0	Minimum standards applicable		Yes
Assessment Criteria		Compliant?	Credits available	Credits achieved	Shell & Core option?
Delivered energy calculated according to NS 3031:2014 and is carried out by a qualified energy modelling engineer/expert		Yes	12	6	N/A
Percentage improvement over the requirements of energy label C		29%			
Ene01 Calculator and Key Performance Indicators					
Calculated delivered energy demand to achieve an energy label C		52.28	kWh/m2yr		
Calculated actual delivered energy demand		37.4	kWh/m2yr		
Total BREEAM credits achieved		6			
Total contribution to overall building score		5.18%			
Total BREEAM innovation credits achieved		N/A			
Minimum standard(s) level		Excellent			