

Greenfield Lane, Rochdale

MCI North West

Energy and Sustainability Statement

AES Sustainability Consultants Ltd

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00	Jennifer Bantin	28.04.2026	Initial Issue
01	Jennifer Bantin	30.04.2026	Policy JP-S1 and JP-S2 from Places for Everyone Joint Development Plan added

This statement has been commissioned by MCI North West to detail the proposed approach to sustainable construction to be employed at Greenfield Lane, Rochdale. It should be noted that the details presented, including the proposed specifications, are subject to change as the detailed design of the dwellings progresses, whilst ensuring that the overall commitments will be achieved.

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1. Introduction

Preface

- 1.1. This Energy and Sustainability Statement has been prepared on behalf of MCI North West in support of a full planning application for a residential development at Land off Greenfield Lane, Rochdale, Greater Manchester.

Development Description

- 1.2. The Greenfield Lane site is located to the south of Rochdale Town centre, between the canal and Rochdale Bypass. The site is currently an inaccessible former industrial site, the surrounding area is a mix of residential and commercial properties.
- 1.3. The proposed development would comprise of 44 dwellings with a mix of 2 and 3 bedroom semi-detached and terraced homes.

Purpose and Scope of the Statement

- 1.4. This statement has been prepared to address relevant national and local policies relating to the sustainable design and construction of dwellings, including the requirements of any local planning conditions in support of the outline planning application. The report details the proposed strategy to energy and CO2 reductions to be employed at the development. It demonstrates that by following a fabric first approach the development will reduce carbon emissions in line with the prevailing Building Regulations standards.

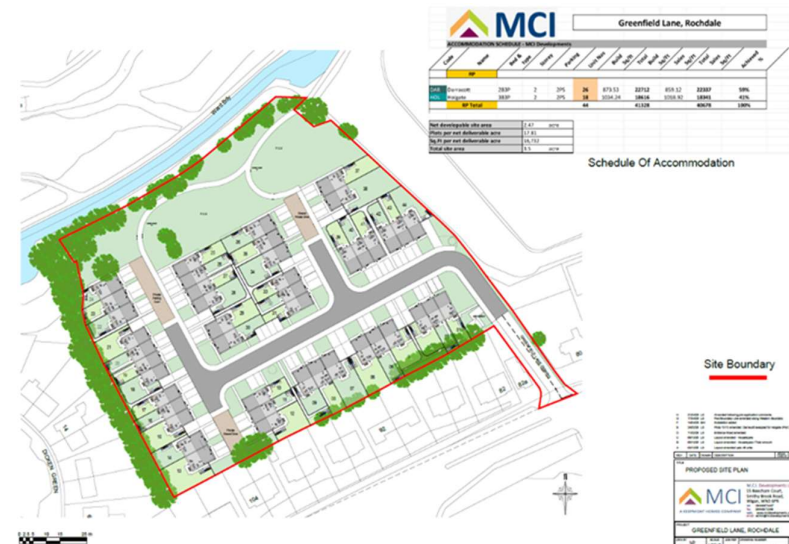


Figure 1. Overall Greenfield Lane Site plan (Revision J)

2. Planning Policy

National Planning Policy Framework

- 2.1. In December 2024 (updated February 2025), the Government published the updated National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these are expected to be applied.
- 2.2. The planning process has been identified as a system to support the transition to a low carbon future in response to climate change by assisting in the reduction of greenhouse gas emissions and supporting renewable and low carbon energy.
- 2.3. Paragraph 164 sets out what is expected from new developments when considering strategies to mitigate and adapt to climate change:

164. New development should be planned for in ways that:

- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and
- b) help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards.

Current National Policy Standards

- 2.4. Government policy in relation to the energy performance of buildings has been evolving over the past decade, following government commitments to reduce the emission of greenhouse gases – particularly CO₂. This obligation was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO₂ emissions by 2050, compared with 1990 levels.
- 2.5. In 2016, the UK government ratified the Paris Agreement, which provides a framework for governments to pursue the target of limiting global warming below 2°C.
- 2.6. In June 2019, the Government announced it had set a new net zero greenhouse gas emission target for the UK by 2050, compared with the previous target of at least 80% reduction from 1990 levels.
- 2.7. The built environment has a key role to play in delivering these international commitments, as it accounts for approximately a third of overall CO₂ emissions. These commitments have been translated into national policies within the built environment driven by, amongst other mechanisms, the EU Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive.
- 2.8. Following the introduction of the 2021 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new-build domestic buildings to be approximately 50% lower than 2006 levels. Similarly, non-domestic buildings have also seen significant updates with a 27% reduction in CO₂ emissions over Part L2A 2013 Building Regulations now being required.
- 2.9. The Government proposes that the Building Regulations are the appropriate mechanism to drive future standards with respect to energy consumption, with local authorities able to apply the optional requirements of the national technical standards with respect to water consumption and space.

Building Regulations Standards

- 2.10. The government introduced the latest revision in Building Regulations, known as Part L 2021 in December 2021, coming into effect for buildings where construction is commenced after 15th June 2023. The current standards require a 31% reduction in CO₂ emissions compared with the previous Building Regulations standard, alongside improvements to fabric standards and a focus on primary energy usage as a new compliance metric.

Rochdale's Local Plan

- 2.11. In October 2016 the whole of the borough of Rochdale adopted the Core Strategy. The Core Strategy documents objectives for proposed developments.
- 2.12. The following text boxes are criteria taken directly from the Rochdale Core Strategy document.

SD1 - Delivering sustainable development

When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work pro-actively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

Planning applications that accord with the policies in this Local Plan will be approved without delay, unless material considerations indicate otherwise.

Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise – taking into account whether:

- Any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or
- Specific policies in the National Planning Policy Framework indicate that development should be restricted.

G1 - Tackling and adapting to climate change

We will address climate change and ensure growth does not increase CO2 emissions by:

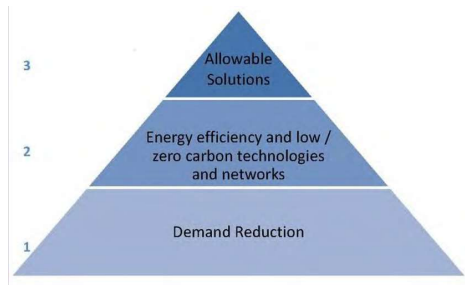
- Locating growth in areas which are likely to minimise the need for travel and which are well served by public transport, services and infrastructure;
- Expecting all development and regeneration schemes to be well connected to surrounding areas and facilities by sustainable means of transport (Policy T2);
- Encouraging and promoting renewable energy developments, including standalone and community developments, that do not, by virtue of their scale, siting, construction or operation, cause harm to the local area, its character and environmental assets and adjoining uses, which cannot be satisfactorily mitigated (Policy G3);
- Promoting the efficient re-use of buildings, especially those of heritage value, and the recycling of construction waste;
- Ensuring that development does not cause unacceptable harm to the borough's peatlands and woodlands, and encouraging their restoration and responsible management;
- Promoting sustainable waste management through the operation of policies in the Core Strategy and Greater Manchester Joint Waste Plan;
- Making the best use of open space to contribute to climate change mitigation and adaptation; and
- Securing planning obligations for energy infrastructure and climate change adaptation measures.

New developments will be expected to:

- a. Be zero carbon in line with national targets and definitions;
- b. Adhere to the 'energy hierarchy' as outlined in policy G2, being designed in such a way that ensures that buildings require the minimum amount of energy to function over their lifetime;
- c. Reduce CO2 emissions through the use of renewable and low carbon decentralised energy technologies and networks. This will be through both on-site provision in new developments and through connection to local networks;
- d. Address the impacts of climate change by incorporating comprehensive adaptation measures, including:
 - i. suitable measures, such as urban greening, for tackling the 'urban heat island' effect;
 - ii. where possible, the opening up of covered and culverted sections of waterways and provision of new water features, to help cooling and provide biodiversity, landscape and flood prevention benefits;
 - iii. the incorporation of appropriate water conservation and management measures, such as Sustainable Drainage Systems (SuDS), including ensuring that the rate of run-off on 'greenfield' sites is not increased and on 'brownfield' sites is significantly reduced, and avoiding the use of impermeable surfaces;
 - iv. the retention of existing trees wherever possible and the taking of all appropriate opportunities to plant trees and other suitable vegetation on site; and
 - v. the incorporation of 'green roofs' wherever possible, such as with flat roofs.

G2 - Energy and new development

All new development will be expected to adhere to the following energy hierarchy to the extent that policy G2 reflects national policy, targets and requirements for that type of development:



1. Demand Reduction - Achieve the maximum possible reduction in demand for energy through building design (i.e. the use of passive systems). At the design stage of new developments, every effort should be made to ensure that buildings use as little energy as possible throughout their lifetimes, using siting, orientation, layout, construction and landscaping to optimise use of natural passive systems such as solar gain and natural lighting, shading, ventilation and cooling to minimise heating, cooling and lighting demands. Green roofs and green walls should be incorporated into developments wherever feasible.

2. Energy efficiency and low / zero carbon technologies and networks - Design to maximize energy efficiency, and use on-site or linked low or zero carbon technologies or direct connection to a low or zero carbon heat source (not necessarily on-site).

3. 'Allowable solutions' - use wider energy efficiency / CO2 reduction measures, which could include developer contributions, to compensate for 'residual emissions' not addressed by 1 or 2 above.

Greater Manchester Places for Everyone Joint Development Plan

2.13. In March 2024 Greater Manchester adopted the Places for Everyone Joint Development Plan, this plan covers Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan.

2.14. The following text boxes are criteria taken directly from the Rochdale Core Strategy document.

Policy JP-S1: Sustainable Development

To help tackle climate change, development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.

In preparing plans, authorities should make as much use as possible of suitable previously-developed (brownfield) land and vacant buildings to meet development needs.

In bringing forward previously developed sites for development, particular attention will be paid to tackling land contamination and stability issues, ensuring that appropriate mitigation and remediation is implemented to enable sites to be brought back into use effectively.

Policy 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(29) 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.

Policy JP-S2: Carbon and Energy continued;

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.

Future Homes Standard (FHS)

- 2.15. The next step change in Part L energy standards, Building Regulations Part L1 2026, a.k.a. the Future Homes Standard (FHS), has now been published for public access. Sites for which planning permission is granted from March 2027 onwards will now fall under FHS; for sites already begun before this date, there will be a 'grace period' until March 2028 to complete dwellings – any dwelling completing after this date will also be required to meet FHS.
- 2.16. Amongst the upcoming targets and requirements now outlined under these Regulations, the installation of fossil-fuel heating (such as gas boilers) will be barred from new dwellings. It will also be mandatory for a large Solar Photovoltaic array to be present on each dwelling, generally amounting to area coverage approximately equivalent to 40% of the main ground floor area (m²).
- 2.17. These new policies have yet to come into effect, but sites should be designed to meet these requirements as they are currently understood. Any site that expects some dwellings to complete construction after FHS has come into effect should therefore demonstrate that they will be compliant with these policies.
- 2.18. Further analysis of these new regulations is ongoing by AES and the community in general; it is confirmed that any and all further adjustments that may be required under FHS will be implemented for this site going forward, when required.

Proposed Site Strategy

- 2.19. This statement is intended to establish the proposed approach to sustainable construction and a reduction in CO₂ emissions to be delivered at the development, in order to meet Building Regulations Part L, and in line with the National and Local policy framework goals of including appropriate measures to mitigate and adapt to climate change through design solutions.
- 2.20. It is possible that some plots on this site may complete after March 2028, these plots will need to comply with FHS. The SAP calculations used in this report comply with the previous Part L requirements, the final design stage SAP calculations will adopt the requirements of the regulatory standards at the relevant time of construction of the dwellings.
- 2.21. This will include following the energy hierarchy approach to low energy design, with consideration given to building design, passive solar design and energy efficient site-layouts as a first principle.
- 2.22. The buildings will be constructed following a fabric first approach, which prioritises improvements to the thermal envelope of the building, including insulation standards, thermal bridging and air leakage.
- 2.23. Low carbon and renewable energy systems will be installed to meet the requirements of regulatory standards and policies. A range of additional sustainable design measures have also been considered.
- 2.24. The following sections of this statement set out the sustainable design considerations which will be applied in order to deliver low energy, comfortable and affordable development.

3. Energy and CO₂ Reduction Strategy

- 3.1. As one of the key areas of ongoing impact of any development, the energy demand of the dwellings to be constructed is a key consideration in the overall sustainability strategy.
- 3.2. As set out within the policy review section of this statement, it is considered that Building Regulations form the minimum requirement for new dwellings in terms of energy performance.
- 3.3. 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% (9% for non-residential) respectively.
- 3.4. Part L 2021 has been mandatory since June 2023, which constitutes a much larger step change of a 31% reduction in emissions.
- 3.5. The Future Homes Standard is the Governments proposed next step in significantly reducing carbon emissions within the built environment and is expected equate to a circa 75-80% improvement on Part L 2013, or a circa 70% uplift on current regulatory standards.

Table 1. CO₂ Emissions improvements from successive Part L editions

Building Regulations	CO ₂ emissions improvements preceding regulations
L1A 2006	-
L1A 2010	25%
L1A 2013	6%
L1 2021	31%
Future Homes Standard	Circa 70%

Energy Reduction Strategy

- 3.6. It is proposed that the energy demand reduction strategy for the development follows the Energy Hierarchy approach to sustainable construction, as shown in Figure 3.

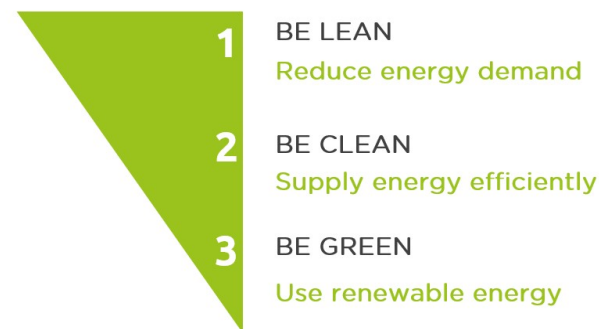


Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

- 3.7. The design of a development - from the masterplan to individual building design - will assist in reducing energy demand and peak load in a variety of ways, with a focus on minimising heating, cooling and lighting loads. Key considerations include:

- Building orientation – maximise passive solar gain and daylight
- Building placement – control overshadowing and wind sheltering
- Landscaping – control daylight, glare and mitigate heat island effects
- Building design – minimise energy demand through fabric specification

Be Clean – supply energy efficiently

3.8. The design and specification of building services to utilise energy efficiently is the next stage of the hierarchy, considering:

- High efficiency heating and cooling systems
- Ventilation systems (with heat recovery where applicable)
- Low energy lighting
- High efficiency appliances and ancillary equipment

Be Green – use low carbon / renewable energy

3.9. Low carbon and renewable energy systems form the final stage of the energy hierarchy and can be used to directly supply energy to buildings or offset energy carbon emissions arising from unavoidable demand. This may be in the form of:

- Low carbon fuel sources – e.g., biomass
- Heat pump technologies
- Building scale renewable energy systems
- Small-scale heat networks
- Development-scale heat networks

4. Energy Demand Reduction

Layout for passive design

- 4.1. Wherever possible, the development will be designed to ensure that the dwellings are able to benefit from passive solar gain. This is achieved through appropriate dwelling spacing, allowing light penetration to all windows, also improving internal daylight levels.
- 4.2. Appropriate orientation of buildings can additionally assist with passive solar gain, and larger fenestration to southern facades will be prioritised. These measures must be balanced against reducing the risks of overheating.
- 4.3. The detailed development layout will respond to these requirements, with future reserved matters applications setting out how these principles have been considered.

Building Fabric – Energy Demand Reduction

- 4.4. As the Energy Hierarchy demonstrates, designing out energy use is weighted more highly than the generation of low-carbon or renewable energy to offset unnecessary demand.
- 4.5. Applied to the development of new buildings, this approach is referred to as 'fabric first' and concentrates finance and efforts on improving U-values, reducing thermal bridging, improving airtightness, and installing energy efficient ventilation and heating services.
- 4.6. This approach has been widely supported by industry and government for some time, particularly in the residential sector, with the Zero Carbon Hub¹ and the Energy Savings Trust² having both stressed the importance of prioritising energy demand as a key factor in delivering resilient, low energy buildings.
- 4.7. The benefits to prospective homeowners of following the Fabric First approach are summarised in Table 2.

Table 2. Benefits of the Fabric First Approach

	Fabric energy efficiency measures	Bolt-on renewable energy technologies
Energy/CO ₂ /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	✓	✗

Building Regulations Standards – Fabric Energy Efficiency

- 4.8. In addition to the CO₂ reduction targets, the importance of energy demand reduction was further supported by the introduction of a minimum fabric standard into Part L1A 2013, based on energy use for heating and cooling a dwelling. This is referred to as the 'Target Fabric Energy Efficiency' (TFEE) and expressed in kWh/m²/year.
- 4.9. This standard enables the decoupling of energy use from CO₂ emissions and serves as an acknowledgement of the importance of reducing demand, rather than simply offsetting CO₂ emissions through low carbon or renewable energy technologies.
- 4.10. The TFEE is calculated based on the specific dwelling being assessed with reference values for the fabric elements contained within Approved Document L1A. These reference values are described as 'statutory guidance' as opposed to mandatory requirements, allowing full flexibility in design approach and balances between different aspects of dwelling energy performance to be struck so that the ultimate goal of achieving the TFEE is met. The proposed approach and indicative construction specifications are set out in the following sections of this Strategy.

¹ Zero Carbon Hub, Zero Carbon Strategies for tomorrow's new homes, Feb 2013

² Energy Savings Trust, Fabric first: Focus on fabric and services improvements to increase energy performance in new homes, 2010

Designed Fabric Specification

- 4.11. In order to ensure that the energy demand of the development is reduced, the dwellings should be designed to minimise heat loss through the fabric wherever possible. Table 3 details a potential fabric specification for the major building elements, with the first column in this table setting out the current Part L1 2021 limiting fabric parameters in order to demonstrate the improvements which will be sought.

Table 3. Proposed construction specification – main elements

	Part L1 2021 Limiting Fabric Parameters	Design Specification - Houses
External wall – U value	0.26 W/m ² K	0.19 W/m ² K
Party wall – U value	0.20 W/m ² K	0.00 W/m ² K
Plane roof – U value	0.16 W/m ² K	0.10 W/m ² K
Ground floor – U value	0.18 W/m ² K	≤ 0.17 W/m ² K (P/A)
Windows – U value	1.60 W/m ² K	1.30 W/m ² K
Doors – U value	1.60 W/m ² K	1.10 W/m ² K
Air Permeability	8.00 m ³ /h.m ² at 50 Pa	≤4.50 m ³ /h.m ² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Y = ≤ 0.039 (averaged)

Thermal bridging

- 4.12. The significance of thermal bridging as a potentially major source of fabric heat losses is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the thermal bridging will not achieve the desired energy and CO₂ reduction targets.
- 4.13. The specification should seek to minimise unnecessary bridging of the insulation layers, with avoidable heat loss therefore being reduced wherever possible. Accurate calculation of these heat losses forms an integral part of the calculations undertaken to establish energy demand of the dwellings (SAP or HEM), and as such thermal modelling will be undertaken to assess the performance of all main building junctions.

Air leakage

- 4.14. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. The proposals assume a minimum airtightness standard of 4.50 m³/h.m² at 50Pa, with pressure testing of all dwellings to be undertaken on completion to confirm that the design figure has been met.

Provisions for Energy-Efficient Operation of the Dwelling

- 4.15. The occupant of the dwelling should be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services. Currently it is assumed that all houses will be provided with high efficiency air source heat pumps, fully insulated primary pipework, and controls including programmers, thermostats and Thermostatic Radiator Valves to avoid unnecessary heating of spaces when not required. Apartments will have high heat retention storage heaters and exhaust air hot water heat pumps.

Eliminate Performance Gap

- 4.16. The reasons why buildings do not perform in accordance with design are increasingly understood. Part L1 2021 introduces a BREL report and photographic evidence requirement which will ensure that key areas of the build affecting thermal performance of each home must be inspected, photographed and reviewed. This process will help to ensure that any issues on a site can be identified prior to completion and handover, and rectification works undertaken in a timely manner.

5. Low Carbon and Renewable Energy Systems

- 5.1. A range of technologies have been assessed for potential incorporation into the scheme in accordance with Regulation 25A of the Building Regulations, and with the goal of showing energy use and emissions mitigation through building design as per local regulations.

Combined Heat and Power (CHP) and District Energy Networks

- 5.2. A CHP unit is capable of generating heat and electricity from a single fuel source. The electricity generated by the CHP unit is used to displace electricity that would otherwise be supplied from the national grid, with the heat generated as effectively a by-product utilised for space and water heating.
- 5.3. The economic and technical viability of a CHP system is largely reliant on a consistent demand for heat throughout the day to ensure that it operates for over 5000 hours per year. Heat demand from mainly residential schemes is not conducive to efficient system operation, with a defined heating season and intermittent daily profile, with peaks in the morning and the evening. For this reason, the use of a CHP system is considered unfeasible for this development.
- 5.4. There are currently no heat networks which extend near the proposed development. High network heat losses associated with distribution to individual houses, as opposed to large high-rise apartment blocks and commercial developments mean that a new heat network to serve the area is not considered viable or an environmentally preferred option.

Wind Power

- 5.5. Locating wind turbines adjacent to areas with buildings presents a number of potential obstacles to deployment. These include the area of land onsite required for effective operation, installation and maintenance access, environmental impact from noise and vibration, visual impact on landscape amenity and potential turbulence caused by adjacent obstacles.

Building Scale Systems

- 5.6. The remaining renewable or low carbon energy systems considered potentially feasible are at a building scale. These are as follows;
- Individual biomass heating
 - Solar thermal
 - Solar photo-voltaic (PV)
 - Air Source Heat Pumps (ASHPs)
 - Ground Source Heat Pump (GSHPs)
 - Hot Water Heat Pumps (HWHPs)
- 5.7. The advantages and disadvantages of these technologies are evaluated in Tables 4-9.

Table 4. Individual Biomass Heating feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Potential to significantly reduce CO₂ emissions as the majority of space and water heating will be supplied by a renewable fuel - Decreased dependence on fossil fuel supply	- A local fuel supply is required to avoid increased transport emissions - Fuel delivery, management and security of supply are critical - Space is required to store fuel, a thermal store and plant - A maintenance regime would be required even though modern systems are relatively low maintenance - Building users or a management company must be able to ensure fuel is supplied to the boiler as required. - Local environmental impacts potentially include increased NO_x and particulate emissions
Estimated costs and benefits	
Cost £2,000 upwards for a wood-pellet boiler, not including cost of fuel	
Conclusions	
Biomass heating is considered technically feasible in large dwellings or buildings provided sufficient space can be accommodated for fuel supply, delivery and management. Air quality concerns in addition to increased transport emissions for fuel delivery mean that it is not a preferred technology for the development.	

Table 5. Solar Thermal systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Mature and reliable technology offsetting the fuel required for heating water - Solar thermal systems require relatively low maintenance - Typically, ~50% of hot water demand in dwellings can be met annually	- Installation is restricted to favourable orientations on an individual building basis - The benefit of installation is limited to the water heating demand of the building - Safe access must be considered for maintenance and service checks - Buildings need to be able to accommodate a large solar hot water cylinder - Distribution losses can be high if long runs of hot water pipes are required - Visual impact may be a concern in special landscape designations (e.g. AONB)
Estimated costs and benefits	
- Cost £2,000 - 5,000 for standard installation - Ongoing offset of heating fuel, minimal maintenance requirements	
Conclusions	
Solar thermal systems are considered technically feasible on all buildings with suitable roof orientations, however the contribution to carbon reduction is expected to be low and therefore it is not a preferred technology.	

Table 6. Solar Photovoltaic systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- The technology offsets grid supplied electricity used for lighting, pumps and fans, appliances and equipment - Mature and well proven technology that is relatively easily integrated into building fabric - Adaptable to future system expansion - Solar resource is not limited by energy loads of the dwelling as any excess generation can be transferred to the national grid - PV systems generally require very little maintenance - Service and maintenance requirement minimal, and 2-3 storey buildings should not require significant additional safety measures (fall protection systems etc) for roof access	- Poor design and installation can lead to lower-than-expected yields (e.g. from shaded locations) - Installation is restricted to favourable orientations - Safe access must be considered for maintenance and service checks - Visual impact may be a concern in special landscape designations (e.g. AONB) or conservation areas - Reflected light may be a concern in some locations
Estimated costs and benefits	
- Cost £1,300 upwards (1kWp+) and scalable - Ongoing offset of electricity fuel costs, minimal maintenance requirements	
Conclusions	
PV panels are considered technically feasible for all buildings with suitable roof orientations. PV panels can be sensitively integrated into the housing typologies and non-domestic buildings through detailed design to ensure no adverse visual or amenity impacts The relatively low cost and limited additional impacts mean that PV is considered a feasible option for this development.	

Table 7. Air Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle - Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 250% - Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	- It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved. - Users must be educated in how heat pump systems should be operated for optimal efficiency - Air source heat pump plant should be integrated into the building design to mitigate concerns regarding the visual impact of bolt-on technology - Noise in operation may be an issue particularly when operating at high output, requires good system design
Estimated costs and benefits	
Cost £5,000 - £7,000 for standard installation	
Conclusions	
Air source heat pumps are technically feasible for the buildings in this scheme and due to the high carbon saving potential are considered a preferred technology. Detailed design can ensure that these systems are integrated carefully to avoid any adverse noise or visual amenity impacts.	

Table 8. Ground Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle - Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 320% - Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	- Low temperature heating circuits (underfloor heating) would be required to maximise the efficiency of heat pumps - A hot water cylinder would also be required for both space and water heating - It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved - Ground source heat pumps either require significant land to incorporate a horizontal looped system or significant expense to drill a bore hole for a vertical looped system
Estimated costs and benefits	
- Cost circa £10,000+ - Estimated simple payback at circa 18 years (systems only) - Running cost linked to COP of heat pump, however may be higher than mains gas - Additional costs to upgrade electricity infrastructure currently unknown	
Conclusions	
Ground source heat pumps are considered technically feasible for buildings in this scheme. Typical communal schemes utilise an approach which is typically funded through annual homeowner payments, increasing overall costs. In addition, the capital cost and difficulty associated with vertical boreholes at this site means that they are not considered a preferred low carbon technology at this stage.	

Table 9. Hot Water Heat Pump Feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Hot water demand met through grid electricity with low effective emissions factor - Heat pump element increases efficiency over immersion heater, circa 200%+ - No external heat exchanger requirement, only intake and exhaust duct runs - Low noise levels - Compact solution in same footprint as hot water cylinder	- Maximum length of duct runs means that cylinder positioning needs to be considered within the dwelling - Less appropriate for larger dwellings with higher hot water demands due to potentially slower recharge rate - Some noise, however likely to be easily suppressed with appropriate cylinder location - Space heating must be met through separate system
Estimated costs and benefits	
- Cost circa £2,500 - Potentially cost-effective where hot water heating is largest proportion of heat demand (e.g. apartments) - Avoids need for external heat exchanger	
Conclusions	
Hot water heat pumps are considered feasible for dwellings with relatively low number of wetrooms and appropriate cylinder location to allow for duct runs to building façade. Hot water heat pumps are considered a preferred low-carbon technology at this stage.	

Summary

- 5.8. Following this feasibility assessment, it is considered that ASHPs are likely to be most suited to the development, delivering highly efficient, low-carbon energy. Additionally, Solar PV may be installed to increase EPC ratings, to reduce energy bills and further reduce CO₂ emissions.

Air Source Heat Pumps

- 5.9. ASHP's work by extracting latent heat from the outside air and passing it through a heat exchanger which increases its temperature. The heat is then fed to the required rooms. ASHPs can have several environmental and operational advantages. More heat is supplied to the building than energy is consumed by the heat pump.
- 5.10. An ASHP with a heating efficiency of 3.5 will supply 3 kilowatts of heat energy for the consumption of 1 kilowatt of electricity. If the heat pump is replacing (or being used as an alternative to) electric space heating, the use of the heat pump offers significant carbon savings.
- 5.11. The introduction of an ASHP would provide a low carbon heating option, generally considered renewable energy if efficiency >250% and lifetime emissions will reduce with ongoing decarbonisation of grid electricity.

Factors to consider:

- 5.12. During times of peak demand (i.e., during winter months) the ambient air temperatures are at their minimum, meaning the ASHP needs to work harder to extract the desired amount of heat.
- 5.13. External space is required for the units, which will need to have adequate air flow whilst being made safe and secure within the building's grounds.
- 5.14. Due to being powered by grid-sourced electricity they can potentially result in increased energy bills for the occupant when compared with gas-fired heating systems in the short term, however, with the government's plan of grid decarbonisation, costs will continue to decrease over time.
- 5.15. The calculations have been based on a leading brand air source heat pump monobloc system which can operate singularly, or form part of a multiple unit system and has a seasonal coefficient of performance of 4.0. By using a monobloc system installation and ongoing maintenance is reduced.

Photovoltaic Panels (PV)

- 5.16. Photovoltaics (PV) or solar cells, as they are often referred to, are semiconductor devices that convert sunlight into direct current (DC) electricity.
- 5.17. Groups of PV cells are electrically configured into modules and arrays which can be used to charge batteries, operate motors and power any number of electrical loads. With the appropriate power conversion equipment (inverters), PV systems can produce alternating current (AC) compatible with any conventional appliances and operate in parallel with the utility grid.
- 5.18. Excess electricity can be sold to the National Grid when the generated power exceeds the local need, this can be beneficial with a large system, when the building is not used all of the time. PV systems require only daylight, not sunlight to generate electricity (although more electricity is produced with more sunlight). Therefore, energy can still be produced in overcast or cloudy conditions and used successfully in all parts of the UK.
- 5.19. PV panels can be fitted to the top of roofs. Ideally the panels should face between south-east and south-west, at an elevation of about 30-40°. However, in the UK even flat roofs receive 90% of the energy of an optimum system.

6. Dwelling Performance

- 6.1. Through following the strategy described, the dwellings will significantly reduce energy demand and consequent CO₂ emissions beyond a Part L compliant level of performance through the dwelling fabric and air source heat pumps. Solar PV will be included to assist with the increase in EPC ratings and, in turn, further reducing the CO₂ emissions of the development.
- 6.2. SAP calculations have been undertaken, using SAP 10.2, on sample house types that are a similar size and build form to those as shown on the site plan to provide an overview of the typical as-designed energy performance, in comparison with Building Regulations standards. The results of these calculations are shown in Table 10.

Table 10. Dwelling performance – CO₂ emissions.

House type	Part L 2021 TER (kgCO ₂ /m ² /year)	Part L 2021 DER (kgCO ₂ /m ² /year)	Improvement %
Darracott Semi/End	11.16	3.69	66.94
Darracott Mid	9.97	3.34	66.50
Holgate Semi/End	10.14	3.48	65.68
Holgate Mid	9.10	3.16	65.27

Fabric Energy Efficiency

- 6.3. Table 11 demonstrates that the dwellings will exceed the uplifted Fabric Energy Efficiency targets within Part L 2021 through the proposed specification.

Table 11. Fabric Energy Efficiency for each house type.

	Target Fabric Energy Efficiency (kWh/m ² /year)	Design Fabric Energy Efficiency (kWh/m ² /year)	Improvement %
Darracott Semi/End	35.74	34.75	2.76
Darracott Mid	30.12	29.04	3.56
Holgate Semi/End	34.44	33.51	2.72
Holgate Mid	29.60	28.52	3.65

- 6.4. The indicative site-wide Part L compliant and as-designed CO₂ emissions are shown in Table 12.

Table 12. Site-wide Part L compliant and as-designed CO₂ emissions

	CO ₂ emissions kgCO ₂ /yr	
Whole site - Part L 2021 compliant	39,094	
Whole site - after fabric measures & ASHP	13,187	
	kgCO ₂ /yr	%
Site-wide saving	25,907	66.27

6.5. Table 13 shows the site wide regulated energy demand and the percentage of energy provided via renewable and low carbon sources.

Table 13. Site-wide regulated energy demand

	kWh / year
Site-wide energy demand	89,604
Energy from ASHP	77,046
Percentage from ASHP	85.98%

7. Resource Efficiency

- 7.1. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development. The Sustainability at Fairham document states that the development will follow the principles of good design set out in “Building for Life”, this is a document developed by the Commission for Architecture and the Built Environment (CABE), the Home Builders Federation (HBF) and the Civic Trust to assess the design quality of homes and neighbourhoods.

The Building for Life Quality Mark is the sign of a good place to live with new well-designed homes and neighbourhoods.

Materials

- 7.2. The impacts of construction materials range from the depletion of natural resources to the greenhouse gas emissions and water use associated with their manufacture and installation.
- 7.3. Within the development choices will be made to reduce the consumption of primary resources and using materials with fewer negative impacts on the environment, including but not limited to the following;
- Use fewer resources and less energy through designing buildings more efficiently.
 - Specify and select materials and products that strike a responsible balance between social, economic and environmental factors.
 - Incorporate the use of locally sourced or recycled construction building materials and aggregates, use resource-efficient products, and give due consideration to end-of-life uses.
 - Influence, specify and source increasing amounts of materials which can be reused and consider future deconstruction and recovery.
 - The preference for using environmentally friendly and more sustainable materials and products such as recycled timber.
 - The use of environmentally friendly surfaces for some streets, driveways and spaces

Waste

- 7.4. 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. Waste in housing comes from two main streams; construction waste and domestic waste during occupation.

Household Waste

- 7.5. In this respect regard has been given to the policy advice contained in the NPPF together with the Fairham Sustainability document in terms of all dwellings are required to have suitable facilities and storage for both waste and recyclable materials.

Construction Waste

- 7.6. The development will additionally be designed to monitor and manage construction site waste effectively and appropriately. Target benchmarks for resource efficiency will be set in accordance with best practice – e.g., 5m³ of waste per 100m² / tonnes waste per m².
- 7.7. Wherever possible, materials will be diverted from landfill through re-use on site, reclamation for re-use, returned to the supplier where a ‘take-back’ scheme is in place or recovered and recycled using an approved waste management contractor.

Electric Vehicle Charging

- 7.8. It is recognised that there is a need to ensure that the development is adaptable to accommodate a future shift in personal transportation to electric vehicles, to promote sustainable transport and to minimise air pollution. As Electric Vehicle (EV) ownership increases, developers have an increasing responsibility to provide EV charging points for occupants.
- 7.9. EV charging units will be installed to meet the requirements of the newly introduced Approved Document S: Infrastructure for charging electric vehicles, of the Building Regulations.

8. Climate Change Resilience

- 8.1. Buildings constructed today are likely to be operating in a substantially different climate over the coming decades and therefore should be designed to ensure that they are resilient to future climate change impacts such as increases in temperature, rainfall, wind and sea level. Climate resilience is important to homeowners and building occupiers against a backdrop of increasingly extraordinary weather events.
- 8.2. Passive design measures will be therefore considered and incorporated to enhance resilience to climate change impacts throughout the lifetime of the development.
- 8.3. Key design decisions can affect the potential risk of overheating:
- Poor consideration of orientation of large glazed facades
 - High density development contributing to urban heat island effects
 - High glazing ratios contributing to excessive unwanted solar gain
 - Inadequate ventilation strategies
 - Very high levels of thermal insulation without considering heat build-up
- 8.4. Other factors which additionally contribute to heat build-up within homes and should be addressed where possible include:
- High levels of occupation
 - Appliance use contributing to internal gains

Cooling hierarchy

- 8.5. In common with sustainable heating strategies, it is possible to apply a sustainable 'cooling hierarchy' which sets out the priorities to ensure overheating risk is minimised:
- Minimise internal heat gain
 - Manage heat through internal thermal mass and design of spaces
 - Passive ventilation strategies
 - Mechanical ventilation systems
 - Active cooling systems

Approved Document O

- 8.6. In order to address overheating risk more robustly, the Government has introduced a new Approved Document, 'Part O', into the Building Regulations.
- 8.7. This document requires a more in-depth assessment of the risk of overheating, considering site location, dwelling orientation, glazing proportions and openable window areas for natural ventilation.
- 8.8. This assessment will be undertaken at the start of detailed design and any mitigation measures that may be required will be built in.



9. Conclusions

- 9.1. This Energy and Sustainability Statement has been prepared by AES Sustainability Consultants on behalf of MCI North West to detail the proposed approach to energy and CO₂ reductions to be employed for development at Land off Greenfield Lane, Rochdale, Greater Manchester, OL11 1TJ.
- 9.2. A review of National Policy including the NPPF and relevant recent Government statements has established that the Building Regulations are now considered the appropriate method for setting standards relating to energy use and CO₂ emissions, considering building design and site-layout to further reduce energy consumption.
- 9.3. The standards contained within Approved Document L 2021 have therefore been reviewed, and a 'Fabric First' approach which prioritises improvements to the fabric of the dwellings to avoid unnecessary energy demand and consequent CO₂ reduction is proposed.
- 9.4. Improvements in insulation specification, efficient building services, a reduction in thermal bridging and unwanted air leakage paths and further passive design measures will enable the relevant standards to be met, whilst building in low energy design and future climate resilience to the design and construction of the dwellings.
- 9.5. It is currently proposed that air source heat pumps are likely to be most suited to the development, providing a significant proportion of the development's energy demand. Additionally, the installation of solar PV systems may be considered, with the aim of increasing EPC ratings, reducing running costs for dwelling occupants and further reducing CO₂ emissions.
- 9.6. Calculations based on the proposed house types demonstrate that through following the energy efficiency approach described, the calculated as-designed emissions are reduced by circa 66% over Part L 2021 requirements.
- 9.7. In line with the need to adapt to a shift in personal transportation to electric vehicles, the development will ensure the provision of EV charging points in accordance with Approved Document S: Infrastructure for charging electric vehicles of Building Regulations.
- 9.8. From March 24th 2027, building control submissions will need to comply with the new Future Homes Standard (FHS) requirements, developments submitted prior to this date will continue to be assessed under the current Part L2021. Any dwellings that have not been started by March 24th 2028 will need to be redesigned to meet the new FHS standards.