AES Sustainability

Middleton Road, Crumpsall

Wain Homes North West

Energy and Sustainability Statement
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Revision 1.0

Building a better world

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Contents

1. Introduction 3
2. Planning Policy 5
3. Climate Change Resilience 20
4. Energy Consumption and CO_2 Emissions 22
5. Low Carbon and Renewable Energy 27
6. As Designed Emissions 34
7. Future Carbon Factors 37
8. Resource Efficiency 38
9. Water Efficiency 40
10. Electric Vehicle Charging 42
11. Post-Occupancy Evaluation 43
12. Conclusions 45

List of tables and figures

Figure 1. Proposed Layout – Middleton Road, Crumpsall 3
Table 1. CO_2 Emissions improvements from successive Part L editions 22
Figure 2. The Energy Hierarchy 22
Table 2. Benefits of the Fabric First approach 24
Table 3. Example construction specification – main elements 25
Table 4. Fabric Energy Efficiency of sample dwellings 25
Table 5. Individual Biomass Heating feasibility appraisal 29
Table 6. Solar Thermal systems feasibility appraisal 29
Table 7. Solar Photovoltaic (PV) systems feasibility appraisal 30
Table 8. Air Source Heat Pump systems feasibility appraisal 31
Table 9. Ground Source Heat Pump systems feasibility appraisal 32
Table 10. Hot Water Heat Pump feasibility appraisal 32
Table 11. Sample dwellings as-designed regulated CO_2 emissions after fabric and ASHPs (Part L 2021) 34
Table 12. Example site wide as-designed regulated CO_2 emissions - Part L 2021 34
Figure 3. Predicted Actual vs Target CO_2 emissions 35
Table 13. Example energy demand before and after renewables/low carbon sources 34
Figure 4. Predicted site wide energy mix 35
Figure 5. Grid carbon intensity – from Treasury Green Book Supplementary Guidance 35
Table 14. Indicative typical Internal Water Demand Calculation 41

1. Introduction

Preface

1.1. This Energy and Sustainability Statement has been prepared by AES on behalf of Wain Homes North West, in support of the application for a residential development of up to 50 dwellings at Middleton Road, Crumpsall.

Development Description

1.2. The proposed development site is located within Salford and falls under the jurisdiction of Manchester City Council.

1.3. The proposals addressed within this statement would deliver 50 dwellings across a mix of three to four bed dwellings. The proposed site layout is shown in Figure 1.



Figure 1. Proposed Layout – Middleton Road, Crumpsall

Purpose and Scope of the Statement

1.4. The statement has been prepared to address local and national policy relating to sustainable design and construction of dwellings, including relevant policies contained within the Manchester City Council Core Strategy and Greater Manchester - Places for Everyone Joint Development Plan (PfE).

1.5. This statement demonstrates that through a combination of fabric measures and low carbon or renewable energy generation, the development will deliver a level of energy performance meeting the current uplifted regulatory standards, with a consideration of the forthcoming Future Homes Standard in the event that any plots have not commenced prior to 24th March 2028.

1.6. A range of additional sustainable design considerations will be addressed including resource efficiency, waste reduction and water efficiency, both during and after construction.

2. Planning Policy

National Planning Policy Framework

2.1. In 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. Paragraph 164 sets out what is expected from new developments when considering strategies to mitigate and adapt to climate change:

> 164. New developments should be planned for 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 adaption measures, including through the planning of green infrastructure; and
>
> b) help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

NPPF Consultation

2.3. In December 2025 the Government launched a consultation on a revised NPPF, which contains proposed Policy PM13:

> PM 13: Setting Standards
>
> 1. Quantitative standards set through development plan policies should be limited to infrastructure provision, affordable housing requirements18, parking and design and placemaking, and where this will provide clarity and a high degree of certainty about the requirements that relevant development proposals are expected to meet. Such standards should:
>
> a. Be justified, drawing upon relevant evidence of local characteristics and needs, while utilising or adapting relevant national standards where it is appropriate to do so (such as in relation to green infrastructure). Evidence in support of standards should be proportionate, in accordance with policy PM8, especially where relevant national standards already exist
>
> b. Not cover matters which are already addressed by Building Regulations, other than in relation to:
>
> i. accessibility standards, for which local standards in relation to requirement M4(2) (accessible and adaptable dwellings) and/or M4(3) (wheelchair user dwellings) of the Building Regulations should be set in line with policy HO5; or
>
> ii. water efficiency, for which it may be appropriate to apply the tighter Building Regulations optional requirement where justified, or exceptionally a more stringent local standard in areas of serious water stress

2.4. The draft policy states that local authorities should not set quantitative standards unless local variation is justified, or technical standards relating to matters covered by the Building Regulations, including energy demand and CO_2 emissions which are covered by Approved Document L. However, the draft NPPF has yet to be adopted so the policies contained within it will not apply until it is.

Current National Policy Standards

2.5. 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 CO_2. This obligation was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO_2 emissions by 2050, compared with 1990 levels.

2.6. 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.

2.7. 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.

2.8. The built environment has a key role to play in delivering these international commitments, as it accounts for approximately a third of overall CO_2 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.

2.9. Following the introduction of the 2021 edition of Building Regulations Part L, the successive updates now require regulated CO_2 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 CO_2 emissions over Part L2A 2013 Building Regulations now being required.

2.10. 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.

2.11. As an acknowledgement of the challenge to the built environment in meeting future 'net-zero' targets, the Government published the next revision to the Building Regulations Approved Document L (Part L) in December 2021.

Future Homes Standard (FHS)

2.12. In 2019, the UK Government committed to making significant changes to the energy and emission targets required by Building Regulations for all new residential development.

2.13. As well as setting the foundations for new standards in energy efficiency and readiness to adopt a zero-carbon future, the policy also introduced objectives to:

- ensure new homes are comfortable to live in during spells of hot water,
- be suitably ventilated with sufficient air flow to mitigate against damp or mould,
- remove the need for fossil fuels when heating homes, and
- ensure newly built homes do not have high running costs

2.14. Six years later, the interim Future Homes Standard has introduced changes to Approved Documents Part L (conservation of fuel) and Part F (ventilation) and led to the creation of a new volume to Building Regulations - Part O - which sets mandatory requirements to limit the risk of overheating in new homes.

2.15. On 23rd March 2026, the government confirmed the final stage of the Future Homes Standard (FHS) and Future Building Standard (FBS).

2.16. The FHS sees a further reduction in Carbon emissions over Part L 2021, mandatory use of photovoltaic panels and an effective ban on the use of fossil fuel heating systems i.e. gas and oil and a shift to fully electrified homes.

2.17. These measures will deliver homes with CO2 emissions over 75% lower than Part L 2013 standards, approaching net zero carbon in many dwelling types.

2.18. For a limited period, there will be two compliance routes under the Future Homes Standard: SAP 10.3 and the Home Energy Model (HEM). Whilst SAP 10.3 is currently available for use, HEM has been delayed with this expected to be released in Summer 2026. In due course, the use of SAP will be phased out meaning all new developments will be modelled using HEM.

2.19. For residential development in England, all new (non-high-rise) dwellings submitted to the Building Authority after 24th March 2027 will need to meet these requirements. Any homes not yet commenced by 24th March 2028 will need to be re-designed to achieve the FHS.

Local Plan

2.20. Manchester Core strategy was adopted in July 2012 and contains policies relating to sustainable design and development. The relevant policies are included in this report.

Policy EN 4
Reducing CO2 Emissions by Enabling Low and Zero Carbon Development

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO2 emissions, and rising fossil fuel prices, through the following actions:

- All development must follow the principle of the Energy Hierarchy, being designed:
  - to reduce the need for energy through design features that provide passive heating,
  - natural lighting and cooling
  - to reduce the need for energy through energy efficient features such as improved
  - insulation and glazing
  - to meet residual energy requirements through the use of low or zero carbon energy
  - generating technologies
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Policy EN 6
Target Framework for CO2 reductions from low or zero carbon energy supplies

Applications for residential development of 10 or more units and all other development over 1,000 sqm will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO2emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows

- Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
- Target 2 Electricity intense areas: Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.
- Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.

Policy EN 6 Continued

Domestic CO2 emissions reduction targets
Table 12.1

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+15% increase on Part L 2010
Target 3: Micro generation area	+15%increase on Part L 2010

Non-domestic CO2 emissions reduction targets
Table 12.2

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings	+10%increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Where the CO2 emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO2 mitigation, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.

Guidance on what the energy statement should contain and how to decide which target applies to a development proposal is given in Appendix A.

Policy EN 8
Adaptation to Climate Change

All new development will be expected to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rain water permeability
- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design
- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO_2 mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.

Greater Manchester Combined Authority

2.21. In March 2024 the Greater Manchester Places for Everyone Joint Development Plan (PfE) was adopted which sets out policies for a long-term plan up to 2039. The PfE is a long-term development plan for the nine districts of Greater Manchester.

2.22. This application considers the implications of meeting compliance with three policy conditions of the Places for Everyone Joint Development Plan (PfE), using a selection of site-specific dwelling designs from the developer.

2.23. The PfE, adopted by the Greater Manchester Combined Authority in March 2024, is a Spatial Strategy with long-term ambitions to improve growth and quality of life for residents, while committing to key delivery principles, such as Manchester's aim to become a carbon neutral city by 2038;

> 1.51. A key element of this is to set out a pathway for new development to be net zero carbon by 2028 at the latest – we do not want to build homes and workplaces which require retrofitting in the future and we have set an ambitious target, backed up by our evidence to achieve this as soon possible.

2.24. The Joint Development Plan is enforced across the Greater Manchester region, covering a population of approximately 2.5 million. Its policies are applied to new development projects across Manchester, Trafford, Salford, Wigan, Bolton, Bury, Rochdale, Oldham and Tameside.

2.25. The application specifically focuses on relevant strategies from the following three policies:

- Policy JP-S1 (Sustainable Development)
- Policy JP-S2 (Carbon and Energy)
- Policy JP-S3 (Heat and Energy Networks)

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.

Part L 2021 of national Building Regulations took effect on 15 June 2022 and is a stepping stone to Future Homes and Future Building Standards (FHS), which is currently being consulted on in 2024 and is expected to be introduced in 2025. In the interim, the policy will follow the trajectory of FHS in relation to carbon reduction with applicants demonstrating how savings have been maximised following the energy hierarchy. From 2025, applicants will need to demonstrate carbon reductions have been maximised with an opportunity to offset any residual carbon to a carbon offset fund. The approach will be reviewed in line with future standards as they are introduced.

Based on the evidence which has informed the 5 Year Environment Plan and achieving net zero carbon in new development, this has shown that there will need to be a significant increase in photovoltaic technology.

Policy JP- S1: Sustainable Development continued...

Therefore, where planning applications for residential development are accompanied by an energy statement, the following best practice thresholds should be seen as the starting point in relation to reducing energy demand and onsite renewable energy generation. The thresholds set out in Table 5.1, for post 2025, are consistent with the GM Five Year Environment Plan.

Table 5.1 Best Practice Thresholds for Reducing Energy Demand and Onsite Renewable Energy Generation within residential developments.

	Space Heat Demand	Hot Water Energy Demand	Renewable Energy Generation Targets
2021 - 2025	Houses (30kWh/m^2) Flats (25kWh/m^2)	20% energy demand reduction in the total heat required for water heating	*Photovoltaic installation: 20% ground floorspace
2025 - onwards	Houses (20kWh/m^2) Flats (15kWh/m^2)	^20% energy demand reduction in the total heat required for water heating	*Photovoltaic installation: 40% ground floorspace
*Ground floorspace used as a proxy for available roof area.	-	-	-
^will need to be reviewed with Future Homes Standard 2025 to determine if savings already embedded.	-	-	-

In calculating carbon emissions from 2025, 'unregulated' emissions (e.g. those associated with cooking and small appliances) should be assessed, in addition to 'regulated' emissions. The only way that this can be deliverable will be through the use of onsite electricity generation or through carbon offsetting ('allowable solutions') as occupants' lifestyle choices are not pre-determined by energy efficiency measures associated with construction standards.

By following the energy hierarchy, new development will need to achieve net zero carbon through the maximisation of on-site measures first. However, in circumstances where a development has demonstrated that the hierarchy has been followed and there are no reasonable alternatives to meet the minimum carbon reductions, then payment to offset remaining emissions will also be required. Such payments should be expected to fund other carbon saving programmes within Greater Manchester to help meet the 5 Year Environment Plan targets (such as energy efficiency retrofit and renewable energy installations).

Policy JP- S1: Sustainable Development continued…

It is also important that post occupancy evaluation is considered as part of a monitoring programme to ensure buildings function as they are designed and mitigation measures can be identified to address any performance gap (where a buildings modelled energy and carbon performance does not equate to actual in-use operation). Various industry initiatives28 are also beginning to address this issue so that this can be minimised early on as part of the design and build process. Supplementary planning guidance can also help developers and planning officers to identify the level of information required to meet these requirements as well as wider policy implementation.

Under amendments to the Building Regulations, the Government has introduced new requirements for installing electric vehicle charge points in new homes, new non-residential buildings, and when some buildings are renovated. New developments will need to meet the requirements set out in Part S of the Building Regulations, unless superseded by relevant Local Plan policies.

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;

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.

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.

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.

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.

Policy JP-S3: Heat and Energy Networks

The provision of decentralised energy infrastructure is critical to the delivery of our objectives for low carbon growth, carbon reductions and an increase in local energy generation. The following measures will help to achieve this:

1. Delivery of renewable and low carbon energy schemes will be supported with particular emphasis on the use of decentralised energy networks in areas identified as "Heat and Energy Network Opportunity Areas". These have been identified where:
   a. Existing heat/energy networks are operational or have been commissioned;
   b. Proposals for new heat networks/energy networks are being progressed, or future opportunities have been identified in city-region master planning;
   c. Sufficient density of existing heat demand occurs; and
   d. Significant future development is proposed at the strategic development locations.
2. Within the identified "Heat and Energy Network Opportunity Areas", unless it can be demonstrated that there are more effective alternatives for minimising carbon emissions or such connection is not practicable or financially viable, it is expected that:
   a. New residential developments that are '10 dwellings or more' or other developments over 1,000 m^2 floorspace shall:

   i. Connect to an existing or planned heat/energy network or be designed to enable future connection (where within 500m of such a network); and/or

   ii. Install a site-wide or communal heat/energy network solution.

Policy JP-S6: Resource Efficiency

The achievement of a circular economy and a zero-waste economy will play a key role in meeting Greater Manchester's ambition of becoming a leading green city region by 2038. The following measures will help achieve this:

iii. Development and implementation of the Zero Waste Strategy for Greater Manchester which promotes overall reduction in the level of waste produced and supports resource efficiency within the Plan area in order to gain the maximum value from the things we produce;

iv. Recognition of the role of existing infrastructure in managing our waste and protecting such facilities to ensure adequate waste management capacity is maintained; and

v. Using sustainable design and construction techniques to reduce carbon emissions, adapt and future proof to the impact of climate change, reduce and recycle waste and minimise water use.

Policy JP-P1: Sustainable Places

We aim to become one of the most liveable city regions in the world, consisting of a series of beautiful, healthy and varied places, each having the following key attributes that all development, wherever appropriate, should be consistent with:

Distinctive, with a clear identity that:

vi. Conserves and enhances the natural environment, landscape features, historic environment and local history and culture;

vii. Enables a clear understanding of how the place has developed; and

viii. Respects and acknowledges the character and identity of the locality in terms of design, siting, size, scale and materials used

Visually stimulating, creating interesting and imaginative environments which raise the human spirit through the use of green space, public art and quality design.

Socially inclusive:

i. Responding to the needs of all parts of society;

ii. Enabling everyone to participate equally and independently;

iii. Providing opportunities for social contact and support; and

iv. Promoting a sense of community

Resilient, capable of dealing with major environmental events

Adaptable, able to respond easily to varied and changing needs and technologies

Durable, being built to last and using robust materials that reflect local character, weather well and are easily maintained

Resource-efficient with:

i. A low carbon footprint

ii. Efficient use of land

iii. Minimised use of new materials

iv. High levels of recycling

Safe, including by designing out crime and terrorism, reducing opportunities for anti-social behaviour and by ensuring that developments make appropriate provision for response and evacuation in the case of an emergency or disaster.

Supported by critical infrastructure, such as energy, water and drainage and green spaces

Functional and convenient, enabling people and uses to act efficiently with minimal effort, and responding to needs relating to servicing, recycling facilities, refuse collection and storage

Incorporating inclusive design within all spaces with support for tackling inequality and poverty to form part of creating sustainable places

Policy JP-P1: Sustainable Places (continued)...

Legible, being easy to understand and navigate, with the protection and enhancement of key views and new development well-integrated into the place

Easy to move around for those of all mobility levels, particularly by walking and cycling, with enjoyable routes free from obstacles and disorienting stimuli, and with places to rest

Well-connected to other places, particularly by public transport and digital infrastructure enabling everyone to take advantage of the employment, cultural and leisure opportunities across Greater Manchester and beyond

Comfortable and inviting, with indoor and outdoor environments:

ix. Offering a high level of amenity that minimises exposure to pollution; and

x. Addressing microclimate issues such as sunlight, indoor air quality, overheating, shade, wind and shelter

Incorporating high quality and well managed green infrastructure and quality public realm, with:

xi. Opportunities for recreation and outdoor play for children, and interaction between the generations;

xii. Public and private spaces clearly distinguished;

xiii. Development clearly defining, and promoting activity within, public spaces;

xiv. High quality landscaping with schemes

Well-served by local shops, services and amenities, including education and health facilities

2.26. This statement will demonstrate the incorporation of sustainable design and construction features in accordance with the relevant regulatory standards.

Proposed Strategy

2.27. This statement is intended to establish the proposed approach to sustainable construction and reduction in CO_2 emissions to be delivered at the development known as Middleton Road, Crumpsall.

2.28. Specifications will be reviewed as needed depending on the site submission time-frame closer to the FHS cut-off date and renewable energy specified.

2.29. The development will address applicable guidance contained within Policies JP-S1, JP-S2, JP-S3, JP-S6 and JP-P1 of the Places for Everyone Joint Development Plan, specifically in relation to the construction of highly efficient buildings which seek to minimise energy use.

2.30. The development will achieve these energy demand targets through higher fabric standards and low carbon and renewable energy systems.

2.31. This statement provides the proposed fabric specification and a strategy to enable the dwellings to meet these standards, with the precise strategy to achieve this being subject to change as development design progresses.

2.32. Additional sustainable construction considerations are addressed, including overheating risk and climate resilience, sustainable and responsible materials usage and water consumption of the dwellings.

2.33. If any plots have not commenced construction by 24 March 2028, in accordance with the transition provisions of the Future Homes Standard, additional measures may be required to address any uplifted performance requirements. This is set out in further detail within the statement

3. Climate Change Resilience

3.1. Dwellings 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 able to adapt and reduce the risk of overheating with potentially higher summer temperatures and longer hot spells.

3.2. Passive design measures will be considered and incorporated to enhance resilience to climate change impacts throughout the lifetime of the development.

3.3. 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

3.4. 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

3.5. 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

3.6. In order to more robustly address overheating risk, the Government has introduced a new Approved Document, 'Part O', into the Building Regulations.

3.7. This document requires a more in-depth assessment of the risk of overheating, taking into account site location, dwelling orientation, glazing proportions and openable window areas for natural ventilation.

3.8. This assessment will need to be undertaken at the start of detailed design and any mitigation measures that may be required will be built in.

3.9. The cooling hierarchy described will be considered, with passive measures of reducing overheating risk given priority. Key measures which will be taken within the development include:

- A layout which incorporates significant green space around the site and in rear gardens reducing the potential for heat build-up in enclosed and low albedo external areas such as tarmac and dark roofs
- Glazing specification which has been considered to balance the requirements for useful solar gain with unwanted summer gain
- Consideration of thermal mass of construction materials to smooth internal temperature profiles, storing excess heat during the day and releasing at night

3.10. Within the development layout, orientation and massing has been considered to maximise useful passive solar gain. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer.

3.11. Window opening areas will be considered and guided by the Part O assessment, with increased opening areas being designed in as required.

3.12. Wherever possible, dwellings will be able to benefit from cross-ventilation to effectively purge warm air from the properties during periods of hot weather. Where cross ventilation is not possible, the Part O assessment will guide alternative mitigation measures which may include additional mechanical ventilation systems, however active cooling systems will be avoided, to reduce energy demands.

4. Energy Consumption and CO_2 Emissions

4.1. 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. As set out within the policy review section of this statement, it is considered that updated Building Regulations standards form the minimum requirement for new dwellings in terms of energy performance.

4.2. As shown in Table 1, the CO_2 standards contained within Part L were increased in 2010 and 2013, reducing the TER by approximately 25% and a further 6% respectively.

4.3. Part L 2021 has been mandatory from June 2023, which constitutes a much larger step change of a 31% reduction in emissions.

4.4. Future Homes Standards (FHS) was confirmed on the 23rd March 2026. It constitutes an expected emissions reduction of circa 75-80% over Part L1 2013 regulatory standards equating to circa 70% over Part L1 2021 standards.

Table 1. CO_2 Emissions improvements from successive Part L editions

Building Regulations	CO_2 emissions improvements over preceding regulations
L1A 2006	-
L1A 2010	25%
L1A 2013	6%
L1 2021	31%
Future Homes Standard	~ 70%

Energy Reduction Strategy – Fabric First

4.5. It is proposed that the energy demand reduction strategy for the development incorporates further improvements beyond a Part L compliant specification and initially concentrates finance and efforts on reducing energy demand as the first stage of the Energy Hierarchy.



Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

4.6. The design of a development - from the masterplan to individual building design - will assist in reducing energy demand 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 overshading 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

4.7. The design and specification of building services to utilise energy efficiently is the next stage of the hierarchy, taking into account:

- 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

4.8. 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

4.9. As this hierarchy demonstrates, designing out energy use is weighted more highly than the generation of low-carbon or renewable energy to offset unnecessary demand. Applied to the development, 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.

4.10. 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.

4.11. The benefits to prospective homeowners of following the Fabric First approach are summarised in Table 2.

[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

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 buildings	✓	×
Savings built-in for life of building	✓	×
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

4.12. In addition to the CO_2 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/m^2/year.

4.13. This standard enables the decoupling of energy use from CO_2 emissions and serves as an acknowledgement of the importance of reducing demand, rather than simply offsetting CO_2 emissions through low carbon or renewable energy technologies.

4.14. The TFEE is calculated based on the specific dwelling being assessed with reference values for the fabric elements contained within Approved Document L. 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.

Proposed Fabric Specification

4.15. 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 the example proposed fabric specification of the major building elements, with the first column in this table setting out the Part L 2021 limiting fabric parameters to demonstrate the improvements delivered.

Table 3. Example construction specification – main elements

	Part L 2021 Limiting Fabric Parameters	Example Proposed 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	0.09 W/m²K
Ground floor – U value	0.18 W/m²K	≤ 0.11-0.12 W/m²K (P/A)
Windows – U value	1.60 W/m²K	≤1.20 W/m²K
Doors – U value	1.60 W/m²K	1.10-1.50 W/m²K
Air Permeability	8.00 m³/h.m² at 50 Pa	≤4.50 m³/h.m² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Y = ≤ 0.040 (average)

Thermal Bridging

4.16. 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 CO_2 reduction targets.

4.17. 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 SAP calculations undertaken to establish energy demand of the dwellings, and as such thermal modelling will be undertaken to assess the performance of all main building junctions.

Air Leakage

4.18. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. The proposal adopts an airtightness standard of 4.50m³/h.m² at 50Pa, with pressure testing of all dwellings to be undertaken on completion to confirm that the design figures have been met.

Fabric Energy Efficiency

4.19. Table 4 demonstrates that the dwellings will exceed the uplifted Fabric Energy Efficiency targets within Part L 2021 through the proposed specification.

Table 4. Fabric Energy Efficiency of sample dwellings

	Target Fabric Energy Efficiency (kWh/m²/year)	Design Fabric Energy Efficiency (kWh/m²/year)	Improvement %
Meadowvale detached 3 bed	39.77	38.46	3.31
Meadowvale semi 3 bed	35.95	34.55	3.89
Coppice semi 3 bed	34.22	32.32	5.55
Coppice Mid 3 bed	29.30	27.26	6.96
Oakrise semi 4 bed	35.25	34.14	3.15

Provisions for Energy-Efficient Operation of the Dwelling

4.20. The occupant of the dwelling should be provided with all necessary literature guidance relating to the energy efficient operation of fixed building services. Currently it is assumed that all houses will be provided with high efficiency ASHPs, mechanical extract ventilation, fully insulated primary pipework, and controls including programmers, thermostats and Thermostatic Radiator Valves (TRVs) to avoid unnecessary heating of spaces when not required.

Eliminate Performance Gap

4.21. The reasons why buildings do not perform in accordance with design are increasingly understood. Part L1 2021 introduced a BREL report and photographic evidence requirement which ensures that key areas of the build affecting thermal performance of each home is inspected, photographed and reviewed. This process helps 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

5.1. A range of technologies have been assessed for potential incorporation into the scheme in accordance with Regulation 25A of the Building Regulations (2013) and with the intent of delivering compliance with the carbon reduction targets contained within Part L 2021.

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. District heat networks are an important part of a sustainable and flexible energy system of which each building is a part, and which enables a more circular approach to energy use by storing, using and reusing energy sources.

5.5. Heat networks provide long-term flexibility to achieve decarbonisation. Existing carbon intensive heat sources and production technologies can be substituted at a later time with new, lower carbon and innovative technologies to support the decarbonisation of the network.

5.6. The Building Research Establishment (BRE) have revised it's guidance on heat network distribution loss factor (DLF) within the Standard Assessment Procedure (SAP, version 10.2). The DLF takes into account the actual heat losses from existing heat networks.

5.7. Only when heat network data has been approved and exists on the Products Characteristics Database (PCDB) can the actual DLF be applied within SAP. A default DLF of 1.50 is applied when the heat network data does not exist on the PCDB database and has been designed and commissioned in accordance with the CIBSE 'Heat Networks: Code of Practice for the UK'. The use of default DLF figure of 1.50 makes the use of a DHN not in the PCDB database unsustainable with negative impact on regulatory compliance and energy performance ratings.

5.8. DHN and communal heat networks are usually classified as commercial systems. Historically there's been a lack of price protection for consumers with heat networks not being covered by a domestic energy price cap however new regulations are being introduced in the near future to tackle this.

5.9. The users also face disadvantages when dealing with electricity tariffs and general running costs of the home. Consumers are tied to a single supplier having no choice within a competitive market. Users are dependent on the system and service response and have limited agency and control.

5.10. 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. Due to these reasons, the provision for future connection to a district heating system is also not proposed.

Wind Power

5.11. 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, including the significant amount of woodland around the development.

5.12. A preliminary examination of the BERR wind speed database indicates that average wind speeds at 10m above ground level are around 5.0m/s. Wind turbines at this site are therefore unlikely to generate sufficient quantities of electrical energy to be cost effective. For these reasons wind power is not considered feasible.

Building Scale Systems

5.13. 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)

5.14. The advantages and disadvantages of these technologies are evaluated in Tables 5-10.

Table 5. Individual Biomass Heating feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Potential to significantly reduce CO_2 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
Conclusions	
Biomass heating is considered technically feasible in large dwellings provided sufficient space can be accommodated for fuel supply, delivery and management however air quality concerns mean that it is not considered appropriate	

Table 6. Solar Thermal systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Mature and reliable technology offsetting the fuel required for heating water (typically gas) • 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. National Landscape)
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 7. Solar Photovoltaic (PV) systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• The technology offsets the high carbon content of 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 (mansafe 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. National Landscape) or conservation areas • Reflected light may be a concern in some locations
Conclusions	
PV panels are considered technically feasible for all buildings with suitable roof orientations. The relatively low cost, high carbon saving potential and limited additional impacts mean that PV is considered a feasible option for this development.	

Table 8. 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	• Air source heat pumps are powered by electricity, with a significantly higher unit price than gas, leading to potentially increased running costs • 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
Conclusions	
Air source heat pumps are technically feasible for the dwellings in this scheme, delivering very low carbon heating and high carbon savings.	

Table 9. 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 • Ground source heat pumps are powered by electricity with a significantly higher unit price than gas, leading to potentially increased running costs • 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
Conclusions	
Ground source heat pumps are considered technically feasible for buildings in this scheme. However, the 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 10. 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
Conclusions	
Hot water heat pumps are considered feasible for dwellings with relatively low number of wet rooms and appropriate cylinder location to allow for duct runs to the building façade.	

Summary

5.15. Following this feasibility assessment, a range of technically feasible low carbon and renewable options were considered, however some of these were discounted on the grounds of increased running costs for residents, or other adverse effects including:

- CHP. It is not considered financially viable or an environmentally preferred option.
- DHN futureproofing. The proposal incorporates individual heating systems, however, the layout of heating equipment will be considered so dwellings can reasonably simply connect to a future DHN network should one become available in the area.
- Biomass heating systems would require significant storage space for fuel as well as regular deliveries at different times to all dwellings. Local NOx and particulate pollution is also an increasing concern, and therefore they are not appropriate for this development.
- Ground source heat pump systems may be technically feasible, however the ground conditions are unknown, and the capital cost is likely to be prohibitive.

5.16. There are two main technologies with significant potential for the development:

- Air Source Heat Pumps
- Solar photovoltaics

5.17. At this stage it is considered that air source heat pumps are most appropriate in meeting a significant proportion of energy demand and reducing carbon emissions significantly beyond a Part L 2021 compliant baseline.

Air Source Heat Pumps

5.18. An ASHP is a low carbon technology which can be used for heating in the winter. 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 (or in reverse for cooling).

5.19. An air-source heat pump with a heating efficiency of 3.5 will supply 3.5 kilowatts of heat energy for the consumption of 1 kilowatt of electricity and can therefore deliver significant carbon savings.

5.20. Air-source heat pumps can have a number of environmental and operational advantages. The amount of heat being supplied to the building is greater than the amount of energy consumed by the heat pump.

5.21. Factors to consider:

- 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.
- 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.

5.22. 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. With the government's plan of grid decarbonisation costs will continue to decrease over time.

Future Homes Standard

5.23. If required, in order to meet the uplifted standards introduced under the Future Homes Standard, consideration will be given to the incorporation of additional solar PV systems in addition to the low carbon heating approach. If required, system designs would be undertaken at design stage and when design stage SAPs have been completed.

6. As Designed Emissions

6.1. By following the strategy outlined, the dwellings will achieve a significant reduction in energy demand and associated CO_2 emissions, surpassing the minimum compliance threshold set by Part L 2021. This will be delivered through the performance of the dwelling fabric, alongside the incorporation of Air Source Heat Pumps.

6.2. Using the latest SAP 10.2 software, a sample range of dwellings have been assessed under Part L 2021 to build a representative site model and establish the predicted CO_2 emissions of the development under Part L 2021, with the proposed fabric strategy applied to provide an overview of the typical as-designed CO_2 emissions. The results of these calculations are shown in Table 11.

Table 11. Sample dwellings as-designed regulated CO_2 emissions after fabric and ASHPs (Part L 2021)

	Part L 2021 Target Emissions ($kgCO_2/yr.$)	As-Designed Emissions ($kgCO_2/yr.$)	Reduction %
Meadowvale detached 3 bed	10.87	3.53	67.53
Meadowvale semi 3 bed	10.04	3.27	67.43
Coppice semi 3 bed	10.27	3.25	68.35
Coppice Mid 3 bed	9.23	2.92	68.36
Oakrise semi 4 bed	10.31	2.90	71.87

6.3. Table 12 shows the expected results of the as-designed CO_2 reduction site wide utilising ASHPs.

Table 12. Example site wide as-designed regulated CO_2 emissions - Part L 2021

	CO_2 emissions ($kgCO_2/year$)
Part L compliant	53,384
Designed	16,184
Savings	37,200
	%
Percentage over Part L 2021	69.70

6.4. The results demonstrate that the proposed site will exceed the Part L 2021 baseline by circa 69 % through the use of ASHPs.

6.5. Figure 3 demonstrates the predicted designed CO_2 emissions against the Part L 2021 compliant CO_2 emissions.

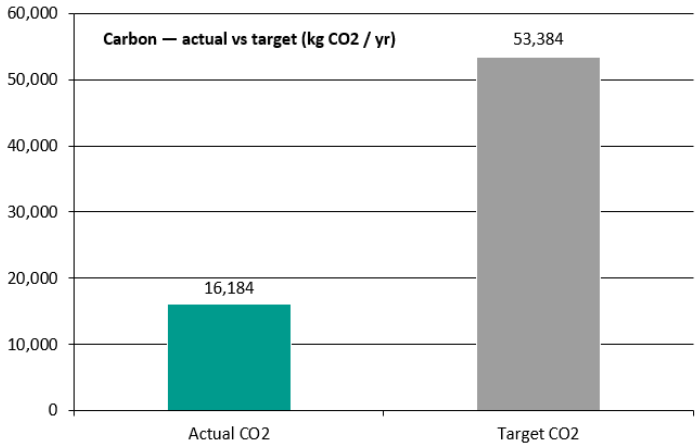


Figure 3. Predicted Actual vs Target CO_2 emissions

6.6. Table 13 demonstrates that the proposed site will deliver circa 62% energy from renewables through the use of ASHPs used to comply with Part L 2021 exceeding Policy requirements.

Table 13. Example energy demand before and after renewables/low carbon sources

	Energy Demand (kWh/year)
Energy demand before renewables	288,255
Energy demand after renewables	109,374
Energy from renewables	178,882
	%
	62.10

6.7. Figure 4 shows the predicted Energy mix site wide.

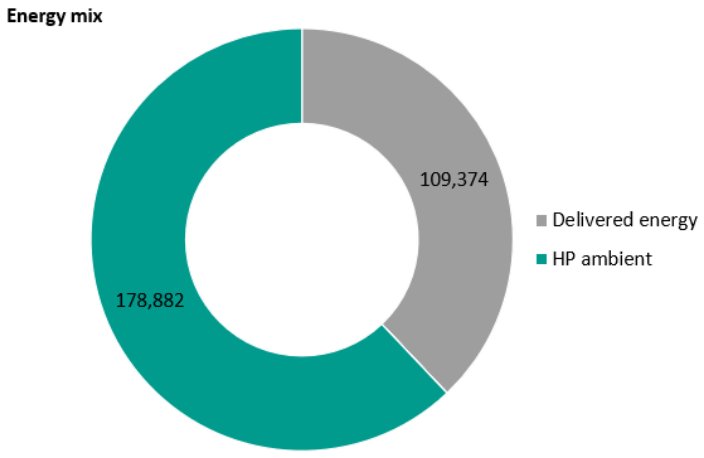


Figure 4. Predicted site wide energy mix

6.8. Plot specific EPC ratings will be available at design stage once detailed SAP calculations have been completed.

6.9. Site wide calculations will be completed once detailed design SAPs that account for plot specific orientation, shadowing and variations have been completed to ensure compliance with all relevant policies and Conditions.

6.10. Ongoing grid decarbonisation will ensure that the annual emissions arising from the dwellings further reduce over time.

6.11. Under Future Homes Standard regulations, a 40% PV coverage is expected, therefore if the development falls under the upcoming regulatory change it will automatically comply with the best practice threshold from Policy JP-S1, table 5.1 2025 – onwards renewable energy generation target.

6.12. By using efficient low-carbon ASHP systems, the hot water energy demand of the dwellings improves by approximately 50-70% compared to traditional electric heating. This is due to ASHPs having a 200-400% efficiency. Therefore, the development is exceeding the best practice threshold from Policy JP-S1, table 5.1 2025 – onwards hot water energy demand of 20% reduction in the total heat required for water heating.

7. Future Carbon Factors

UK electricity grid

7.1. The UK electricity grid is a success story of environmental policy to address carbon emissions from the UK, and has been credited as the main reason why the UK has met its international obligations relating to carbon reductions enshrined within the Climate Change Act.

- All electric approaches may be considered desirable for the following reasons:
- Low carbon
- Avoidance of unnecessary gas infrastructure
- Reduced internal riser space requirements (increased space in dwellings)
- Zero on-site emissions of particulates or NO_x

7.2. Figure 5 shows the Treasury Green Book supplementary guidance projections for 30 years from 2028, with an estimated carbon emission factor of approximately 0.025kgCO_2/kWh by 2035, dropping to almost full decarbonisation from 2040 onwards.

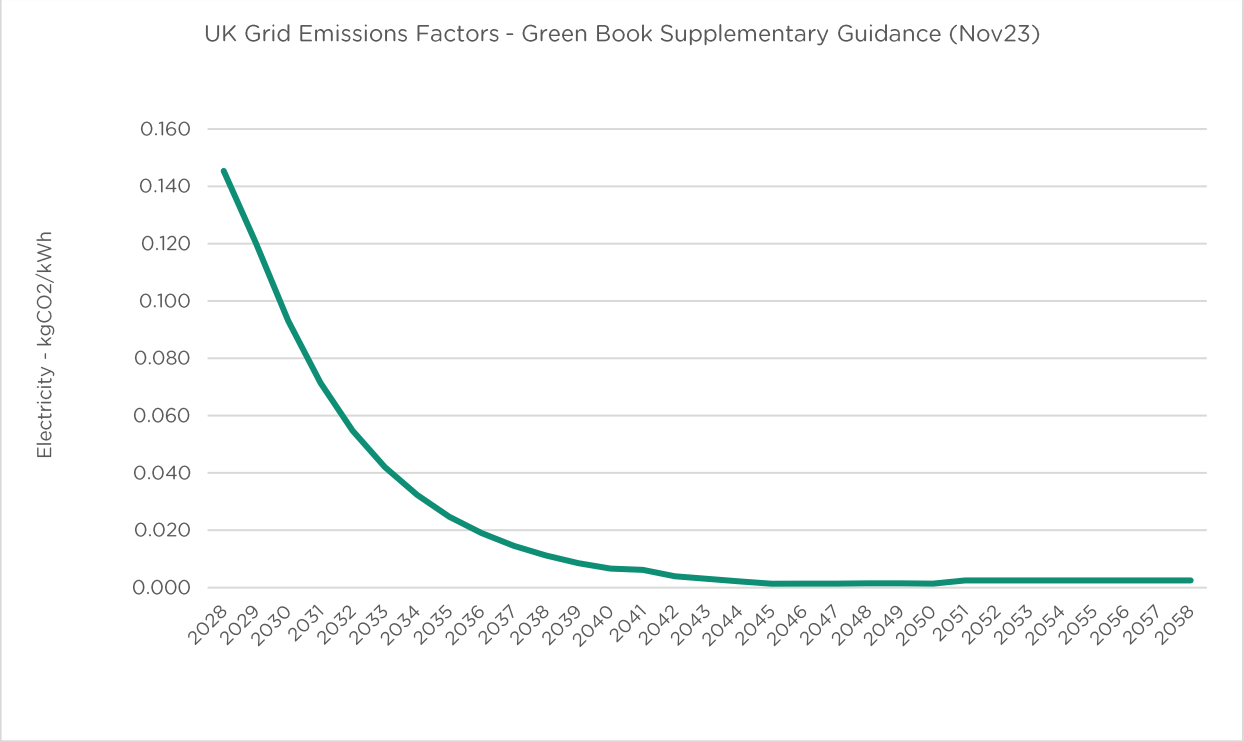


Figure 5. Grid carbon intensity – from Treasury Green Book Supplementary Guidance

8. Resource Efficiency

8.1. It is important that development is efficient with resources both during construction and in operation of the development. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development.

Materials

8.2. 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.

8.3. Within the development choices will be made in order 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 recycled content, 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.

Embodied Carbon

8.4. As the operational energy use of buildings is reduced through design and specification as described, the embodied carbon in the building materials and process becomes a much greater proportion of the overall impact of a development.

8.5. There is currently no legislation governing embodied carbon, however measures to reduce embodied carbon may include consideration of:

- Selection of materials with high natural content
- Selection of low embodied carbon option for all materials
- Recycled plastics in windows, pipework and cavity closers
- Recycled content in gypsum plasterboard
- Use of recycled (crushed) aggregate as hardcore
- Recycled elevation treatments where feasible i.e., rooftiles, bricks, architectural features.

Waste

8.6. 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

8.7. In this respect, regard has been given to the policy advice contained in the NPPF together with the Council's current strategy in terms of waste and recycling, to ensure that the new dwellings are provided with adequate storage facilities for both waste and recyclable materials.

8.8. Manchester City Council currently offer kerbside collection for recycling, separated into the below collection streams:

- Recycling – Blue and Brown Bins
- General waste – Black Bin

- Food waste – Green Bin
- Garden Waste – Green Bin

8.9. Dedicated bin storage space will be provided on plot to accommodate the relevant collection boxes.

8.10. Future occupiers of the dwellings will be provided with an information pack detailing the Council's current collection arrangements for waste and recycling and advising of the nearest recycling centres to the Application site.

Construction Waste

8.11. 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., $5m^3$ of waste per $100m^2$ / tonnes waste per m^2.

8.12. 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.

9. Water Efficiency

9.1. The UK Climate Change Risk Assessment 2017 identified risks of shortages in water supply as a future climate change impact. Therefore, the efficient use of water is an important factor when considering future resilience to climate change.

9.2. As well as aiming to minimise water usage through the materials used, water consumption of the end user will be considered in line with current national policy. Building Regulations 2013 Part G require water efficiency measures for all new dwellings:

> Water Efficiency
>
> G2. 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.
>
> Water Efficiency of New Dwellings
>
> 36. (1) The potential consumption of wholesome water by persons occupying a new dwelling must not exceed the requirement in paragraph (2)
>
> (2) The requirement referred to in paragraph (1) is either –
>
> (a) 125 litres per person per day; or
>
> (b) in a case to which paragraph (3) applies, the optional requirement of 110 litres per person per day,
>
> As measured in either case in accordance with a methodology approved by the Secretary of State.

9.3. Water efficiency measures are met under Part G if: The estimated consumption of wholesome water resulting from the design of cold and hot water systems (calculated in accordance with the methodology set out in Appendix A) is not greater than the standard set by the Secretary of State of 125/litres/person/day, or the optional standard of 110 litres/person/day.

9.4. Appendix A of Part G provides a water efficiency calculation methodology. This assesses the whole house potable water consumption in new dwellings. The calculation methodology is to be used to assess compliance against the water performance targets in Regulation 36 to ensure that all new dwellings meet the water efficiency requirement.

9.5. The references provided in Part G Table 2.1 will be considered to ensure that efficient fittings are installed to each dwelling. Each new dwelling could minimise water usage to at least 110 litres/person/day in line with the current national optional standards.

Indicative Water Efficiency Measures

9.6. Water use will be managed effectively throughout the development through the incorporation of appropriate efficiency measures.

9.7. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and taps, and appropriately sized baths will be encouraged, with the aim to limit the use of water during the operation of the development.

9.8. Table 14 shows how the development could achieve a result less than 110 litres/occupier/day in line current optional standards. The current Part G Building Regulations requirement is to meet the 125 litres/occupier/day.

Table 14. Indicative typical Internal Water Demand Calculation

Installation Type	Unit of measure	Capacity/ flow rate	Litres/occupier/day
WC (dual flush)	Full flush (l)	6	8.76
	Part flush (l)	4	11.84
Taps (excluding kitchen taps)	flow rate (l/min)	4	7.90
Bath	Capacity to overflow (l)	181	19.91
Shower	Flow rate (l/min)	8	34.96
Kitchen sink taps	Flow rate (l/min)	6	13.00
Washing Machine	Litres/kg dry load	6.8	14.28
Dishwasher	Litres/place setting	1.04	3.74
Calculated Use			114.4
Normalisation Factor			0.91
Total Internal Consumption (L)			104.1
External Use			5.0
Building Regulations 17.K			109.1

10. Electric Vehicle Charging

10.1. 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.

10.2. The newly introduced Approved Document S mandates a certain level of EV charger provision for all new developments commenced after the requirements came into force in June 2023. These standards will therefore be followed.

10.3. Further technical details of the charger, along with locations, can be provided once available.

11. Post-Occupancy Evaluation

11.1. The Joint Development Plan recommends Post-Occupancy Evaluation (POE) is considered on newly constructed residential developments.

11.2. Part L calculations and Energy Performance Certificates (EPCs) give an indication of the theoretical performance of buildings.

11.3. POE is used to monitor the real-world energy use of a dwelling during its initial occupation. The results of this monitoring, which usually take place over 12 months, can then be compared to the design stage SAP calculations to show how accurate the design predictions were, and to search for trends where disparities are commonly shown.

11.4. It is widely accepted that SAP calculations are too simplistic to deliver truly accurate results and is unable to consider the individual behaviours of occupants. The new Home Energy Model will offer greater flexibility which is expected to go someway to resolving industry concerns with the current methodology tool.

11.5. Post Occupation Evaluation is not currently featured in Building Regulations, but the Future Homes Standard 2023 consultation discussed the possibility of introducing some form of post-construction monitoring as a voluntary standard written into the next revision of Approved Document Part L.

11.6. Common approaches to measuring POE include;

For major developments;

- Energy supplier data collection. In cases where the housing developer is also the energy supplier, the energy use can be recorded and reported by the developer directly.
- Automatic Meter Reading (AMR devices) can be installed to homes to anonymously record energy use and report back to a central contact. This is usually administered by the Local Authority which will have a working partnership with an AMR supplier.
- Upstream meters can be installed by the UK Power Network (UKPN) which can measure the combined energy performance of an entire development or apartment block. This removes the need for plot specific data collection but means individual plot performance cannot be measured.
- Install aggregate electrical metering to a consistent standard on sub distribution networks which supply residential apartments.

For smaller developments;

- Occupiers of new dwellings can supply regular meter readings manually to the developer who will collect this information for an agreed time period (usually one year). To maintain the occupiers anonymity, the developer must combine meter readings of at least five dwellings, known as reporting units. The occupier can refuse to share this information unless contractually obliged.
- Pre-occupancy testing can measure the energy performance of a dwelling before it is occupied. Heat Transfer Coefficient (HTC) testing is a unique approach which focuses solely on the building performance without considering the behaviour of occupants. As SAP and EPC calculations also take this approach, HTC is considered a fairer way of measuring the POE of a building. HTC testing can only be completed during the heating season (November to March).

Education

11.7. Encouraging occupiers to use their home efficiently is a key approach to reducing energy use and lowering fuel bills. Smart Meters give occupiers live data on the energy they're using and how much it is costing. The Developer should ensure that Smart Meters are installed as standard in all dwellings on site.

11.8. Home User Guides should be provided to the first occupiers of any new dwelling. This information pack includes details about the dwelling's heating and ventilation systems and offers advice for reducing energy bills by using the system's controls and thermostats effectively.

Proposed Metering Strategy

11.9. In this case, it is proposed that the development will utilise the following;

- Installing Smart Meters in all dwellings
- Providing Home User Guides to the first occupiers of all dwellings

11.10. It is proposed that all dwellings shall be provided with smart meters. The specific system to be adopted has not been selected and shall be subject to detailed design. The systems selected shall enable the monitoring of heat and energy (including unregulated energy associated with appliances and cooking) via an energy display device, to allow residents to manage their energy use. By monitoring energy use in real time, residents will directly be able to reduce unregulated energy consumption.

12. Conclusions

12.1. This Sustainability Statement has been prepared by AES on behalf Wain Homes North West in support of the planning application for a residential development of up to 50 dwellings at Middleton Road, Crumpsall.

12.2. The proposed development site is located within Salford and falls under the jurisdiction of Manchester City Council.

12.3. The application comprises of the development of up to 50 plots, across a mix of three to four bedroom dwellings.

12.4. This statement has been prepared to address relevant national and local policies relating to the sustainable design and construction of dwellings, including relevant policies within the Manchester City Council Core Strategy and the Greater Manchester Places for Everyone Joint Development Plan (PfE).

12.5. In line with the energy hierarchy, the statement sets out a fabric first approach to sustainable construction, demonstrating that improvements in insulation specification, a reduction in thermal bridging and unwanted air leakage paths, and further passive design measures will ensure that energy demand and consequent CO_2 emissions are minimised as a first principle.

12.6. A range of potentially appropriate low carbon technologies has been assessed for feasibility in delivering a further reduction in CO_2 emissions. It has been concluded that air source heat pumps are considered the most appropriate technologies for this site.

12.7. All homes will be delivered to meet the minimum requirements of Part L 2021 with the proposed strategy of ASHPs reducing carbon emissions by circa 69% and delivering circa 62% of the development's energy from renewables.

12.8. Ongoing grid decarbonisation will ensure that the annual emissions arising from the dwellings further reduce over time.

12.9. Indicative water calculations show the development can reduce water demand to 110 litres/occupier/day in compliance with current optional standards.

12.10. The development will additionally consider the longer-term impacts of a changing climate, building in resilience through the construction specification and managing overheating risk through consideration of thermal mass and solar gain.

12.11. The theory of post-occupancy evaluation is that real-life data from the energy performance of newly built dwellings can be reviewed against the design intent. There is no standard approach for measuring this data. It is therefore proposed that the developer commits to installing smart meters in all dwellings and provide home user guides to the first occupiers.

12.12. The statement additionally details the proposed approach to addressing overheating risk and climate resilience, sustainable and responsible materials usage, waste and recycling storage and water consumption of the dwellings, electric vehicle charging and proposed post-occupancy evaluation.

12.13. The development will be designed to be resilient to a future changing climate, through passive design measures, to reduce the risk of overheating and fenestration designs and specifications guided by the new Approved Document O calculations.

AES Sustainability

Contact
01884 242050
info@aessc.co.uk

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